Graduate School of Oceanography
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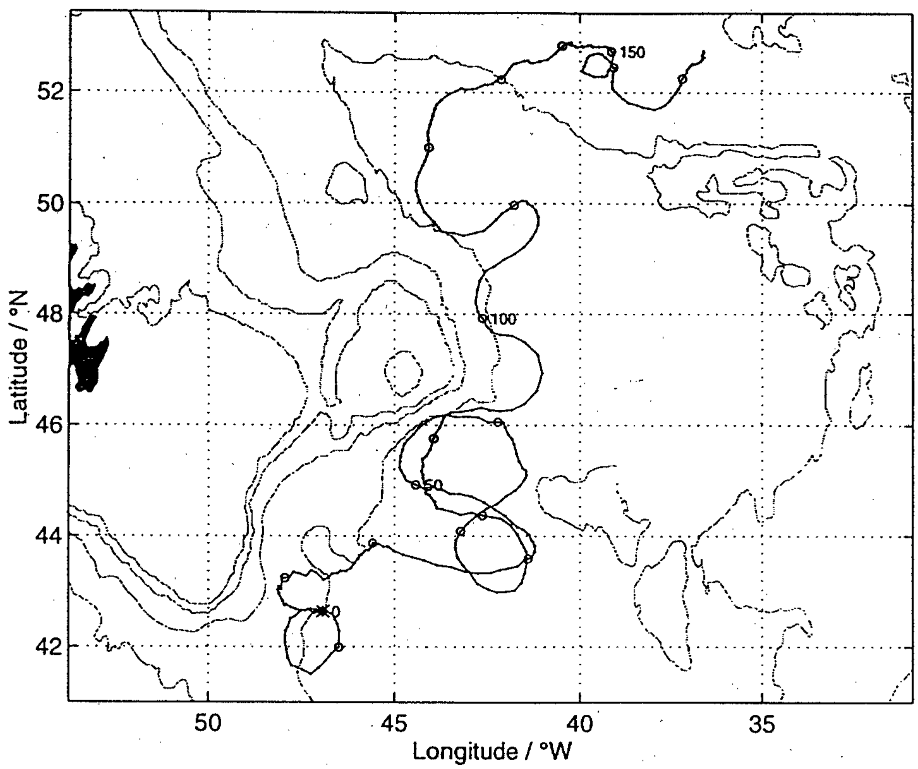
University of Rhode Island

RAFOS Float Data Report of the North Atlantic Current Study 1993-1995



by

Sandra Anderson-Fontana
Mark Prater
H. Thomas Rossby

GSO Technical Report No. 96-4
September 1996

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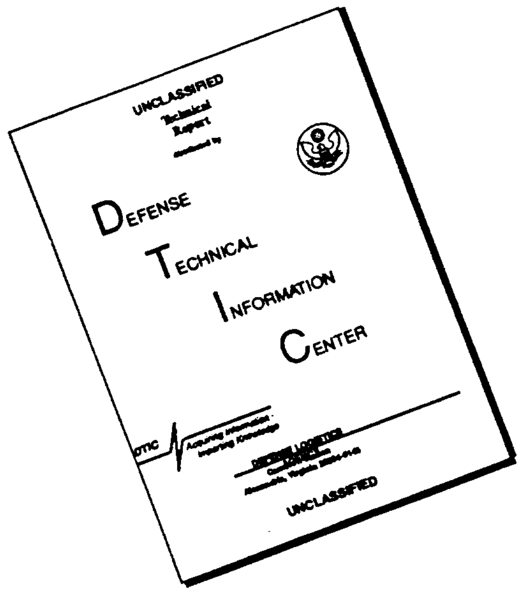

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Approved for Distribution ___ Margaret Leinen
SIGNATURE

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1. Introduction

This is the final data report of all RAFOS float data collected during the 1993-1995 study of the North Atlantic Current (NAC) and adjacent waters in the Newfoundland Basin. The objective of the program, jointly supported by the Office of Naval Research and the National Science Foundation, was to study the structure of the currents in the NAC region and the exchange of waters between the subtropical and subpolar gyres in the Newfoundland Basin. One hundred floats were deployed on two density surfaces corresponding to $\sigma_t = 27.2$ and 27.5, respectively. All floats were designed to cycle once or twice a day to density surfaces 0.1 σ_t units above and below their nominal level to determine changes in stratification and temperature along the trajectories. Three separate float deployments took place: July-August 1993, November-December 1993 and October-November 1994. The first cruise was on the R/V *Oceanus*, the other two on the CSS *Hudson.* CTD casts were taken at nearly all deployments. Most float missions had a duration of ten months. The floats were tracked using four moored sound sources developed by Sparton of Canada, energized by power modules from Webb Research Corp. of East Falmouth, Massachusetts (Rossby et al., 1993). The sources were deployed on the R/V *Oceanus* cruise (July 1993) and recovered on a CSS *Hudson* cruise in June 1995.

2. Description of RAFOS *f/h* floats

The float used in this project is based on the design developed for the Anatomy of Gulf Stream Meanders project (Rossby et al., 1994). That paper should be consulted for a detailed discussion of the principle of operation and some first test results in the Gulf Stream. The *f/h* float is basically a standard isopycnal RAFOS float to which a small pump, or *vo*lume *cha*nger (VOCHA), has been added. The pump changes the volume or, equivalently, the density (since the mass is constant) of the float $\pm 0.01\%$ (1.5 cm^3 in 15 liters), causing it to move up or down to the corresponding isopycnal. Once the float is at equilibrium (which was assumed to be attained within a given time delay), the pressure and temperature

are recorded. The difference in pressure between the two neighboring surfaces yields an estimate of stratification. The floats are made very nearly isopycnal in seawater by adding a compressible element (the compressee) so that the complete float has very nearly the same compressibility ($\pm 1\%$) as that of the seawater. See Rossby et al. (1985) or Goodman and Levine (1990) for a detailed discussion. The time series of pressure, temperature and their differences between the isopycnal surfaces are plotted for all floats (Section 9).

3. Float Ballasting

All floats were ballasted at the Graduate School of Oceanography. Ballasting consists of several stages, all to ensure that the float will descend to the desired level (or density surface). We will summarize the ballasting procedure here, and for more detail the reader is referred to Rossby et al. (1986), König and Zenk (1992), Swift and Riser (1994), and Boebel et al. (1995). First the assembled float is weighed on a digital precision scale, then "preballasted" in an unpressurized tank filled with room temperature tap water. The float is initially positively buoyant in the tank, and weights (approximately 2 kg) are added until the float is almost neutrally buoyant. This extra weight is released when the float mission is over, thus allowing the float to rise to the surface and expose the glass-enclosed Argos antenna. Free-hanging chains are taped to the bottom of the float before the float is placed in the high-pressure tank. Additional trim weights are added so that the float has a slight negative buoyancy, with some of the chain now resting on the floor of the pressure tank. The float is positioned so that a video camera, aimed through a porthole in the side of the tank, is able to view a graduated paper scale inside the float. The tank is then closed and pressurized. The float itself is significantly less compressible than water, and increases in buoyancy (and thus rises) with increased pressure, lifting more of the suspended chain off the tank floor. The f/h floats, however, have a compressee, whereby the compressibility of water is nearly matched, and therefore have little or no change in buoyancy with pressure. The scale height versus tank pressure is recorded, and this scale reading indicates the length of chain suspended. The tank's pressure is slowly cycled up and down, and stopped at intervals to record the pressure

level and the scale reading. When we feel that the pressure versus scale reading relationship is well defined, the tank is depressurized, the water temperature is measured again, the trim weights are removed and weighed, and the float is removed from the tank. Since individual floats vary slightly in properties (due to irregularities in the glass and stiffness of the compressee), individual pressure-scale relationships (or more precisely, compressibility) must be computed, and thus this ballasting process must be repeated for each float.

The pressure-scale relationship allows us to determine the correct weight to add to the float to achieve neutral buoyancy at the target pressure, albeit with tank water at tank temperature. To correct for the target temperatures and salinities, the target density and the density of the tank water are computed from the seawater equation-of-state (Fofonoff and Millard, 1983). The difference between these densities multiplied by the float's target volume (accounting for the float's compressibility and thermal expansion) gives the additional weight required to assure neutral buoyancy at the specified level in the ocean. This seawater weight correction is approximately 500 grams. For a float to reach a target isopycnal to within 0.1 σ_t, the float's equation-of-state must be known to (and the mass of the float corrected to) 1.5 grams out of a total float mass of 15000 grams.

The uncertainty of the ballasting procedure itself is less than 0.03 σ_t units (0.5 gram), but this is for fresh water in the tank. In practice the accuracy is closer to ± 0.1 σ_t in the three groups of floats that were ballasted, as can be seen from the differences in nominal and estimated σ_t in Tables 2a-c. Knowledge of the ballasting errors comes from a detailed comparison with the CTD casts made at the time of deployment and the time history of temperature during their missions. The reason for this larger error comes from the additional step of adding a nearly 500 gram weight to make a float neutrally buoyant on an isopycnal surface in the ocean. In principle this is very straightforward. In practice, errors creep in, primarily due to variations in apparent density resulting from the type of anti-corrosion treatment or paint used to protect the different groups of drop weights. We know from more recent experience ballasting 12 floats for a Gulf Stream project in September 1995 that these errors or uncertainties can be reduced significantly. Those 12 floats, whose add-on weights

were not painted or given any surface treatment, went to the target density ± 0.03 σ_t units.

In discussing the density surfaces, we often refer to a certain σ_t surface. In reality we think the floats behave much more like specific volume anomaly (δ) surface followers. σ_t surfaces are defined only in terms of temperature and salinity, with pressure constant. δ allows for density changes due to pressure, specifically:

$$\delta(T, S, P) = \alpha(T, S, P) - \alpha(T = 0, S = 35, P),$$

where α is the specific volume. The first term on the right is the in situ specific volume and the second term the specific volume while holding T and S at the values indicated. This is the conventional definition of δ. In this project δ is estimated relative to T = 4.6°C and S = 34.6 PSU, corresponding to a mean centered between the Newfoundland Basin and Labrador Sea waters. The float follows δ surfaces by design since it is given close to the same compressibility as that of sea water (by means of the compressee; Rossby et al., 1985), but has virtually no temperature dependence (borosilicate glass) and certainly no salinity dependence, thereby mimicking closely the properties of the second term on right. McDougall (1989) has argued that δ-surfaces are good approximations to neutral surfaces. A very useful discussion of RAFOS float and ballasting issues can be found in a report edited by A. Bower (1994).

4. Deployment of Sound Sources

The sound sources were developed by Sparton of Canada to provide efficient wide-area insonification. The power and electronic packs were supplied by Webb Research Corp., with energy sufficient for well over two years of service at two transmissions/day. The signaling system itself is the conventional SOFAR signal and consists of a frequency-modulated sweep of 80-s duration, where the frequency is incremented linearly from 259.375 to 260.898 Hz in 2-s steps, with phase continuity preserved at each step (Webb, 1977). The source has a dipole radiation pattern with a horizontal source level of 195.5 dB re 1 μPa at 1 m. (See Rossby et al., 1993 for a complete description of the system.) Figure 1 shows the locations of the four sound source moorings (also see Table 1). The sources were at a depth of about

1400m. All sources functioned reliably for the duration of the study, but SS#2 (mooring #M3) had a significantly reduced source level due to a spurious mechanical resonance close to the operating frequency, resulting in a degraded transmitting voltage response. The power packs were kept separate from the resonant pipe projectors via a 100 foot long umbilical cable in order to minimize possible damage due to vibration from the source. This may have been fortunate, for after recovery considerable internal chafing around the shock mounts for the electronics was discovered.

The moorings were designed and deployed by Mr. John Kemp (WHOI). Mr. Tom Orvosh (GSO/URI) was in charge of the electrical integration of the sources, and their preparation at sea prior to deployment. Mr. John Dunlap of the Applied Physics Laboratory at the University of Washington was very helpful in solving some electrical problems that developed just prior to launch. Table 1 lists the deployment dates and locations of the sound source moorings, and their transmission times.

5. Deployment of Floats

The deployment strategy of the project was as to release floats (1) from three different cruises so as to sample the NAC at different times; and (2) on both sides of and within the NAC to explore cross-frontal pathways and exchange processes. The two density surfaces chosen were $\sigma_t = 27.2$ and 27.5. The deeper surface is the shallowest one that does not make local contact with the atmosphere in winter, whereas the shallower surface was chosen because it was expected to outcrop, at least north of the subpolar front (the eastward extension of the NAC). Mission lengths of ten months ensured that the floats would experience all four seasons. The last group of floats had only eight month missions due to the scheduled recovery of the sound sources in June 1995. Tables 2a, 2b and 2c summarize in detail all float deployments: date, position, σ_t surface (target and estimated) and mission length, with footnotes as necessary.

6. Float Tracking

A total of 100 floats were released on the three cruises. At the end of its mission, each float releases ballast, returns to the surface, and telemeters data to Argos, a French satellite-based data collection and platform location system. Once all the float's data are transferred to our computer system and processed, the trajectory of the float can be reconstructed from the time series of acoustic travel times. The pressure and temperature time series are also included in the telemetered data. Most floats transmitted data for five to six weeks before their batteries wore out, though each float data set was complete, or nearly so, in less than two weeks. There were only four floats that failed to transmit any information: 250, 251, 278 and 319. Three floats ended their missions early when CPU activity, as monitored by their watchdog timers, ceased (253 and 322 after 57 days, and 338 after one day); two lost their ballast weights very early, one (302) during deployment and the other (271) soon after; one had no acoustic data (281); one (317) transmitted only 10% of its data; and one (290) failed to transmit any reliable data. A number of floats in the first group and a few later ones (297, 309 and 323) had a subtle problem in their temperature circuits. The thermistor resistance controls the frequency of an oscillator circuit. If the frequency was very close to certain values related to the computer clock cycle, the frequency would, in some floats, 'lock' onto it. This was due to the omission of a by-pass capacitor in the counter chip, which was added in the later float releases. Tests were unable to find any bias or errors in temperature at frequencies in between these locked frequencies.

The floats were able to hear strong signals from sources 1, 3 and 4 until the end of each listening window (25 minutes). Figure 2 shows an example of the travel times from all four sound sources, and the strength and continuity of the signals, as recorded by float 279. The degradation of the signals from source 2 is also evident in this figure. In most cases, the travel time series from the other three sources were sufficient for accurate float tracking, with very few source geometry problems due to the absence of usable signals from source 2.

Float and sound source clock drifts are factored into the float trajectory calculations. The float clock drift is obtained from the time of the first transmission from the float to the

Argos system compared to the expected time of the first transmission. The sound source drifts were first estimated based on the arrival times at a few selected floats just prior to surfacing, compared to the expected arrival times at the surface positions (assuming little surface drift). We assume a linear sound source clock drift. Errors are introduced in these calculations, however, due to (1) the elapsed time between the recording of the final arrival times by the float prior to surfacing and the transmission of the first Argos position (several hours); and (2) the chosen speed of sound used in the calculations. Fortunately when the sound sources were recovered in June 1995, we were able to obtain an accurate time of transmission from sound source 1 during the recovery process. Based on this information and the earlier calculations showing sources 1, 2 and 3 to have very similar drifts, we've determined the drifts as listed in Table 1. The drift for source 4 is based on its relationship to the other three in the earlier calculations.

The RAFOS float trajectories, along with middle pressure, middle temperature and velocity time series, are shown in Section 9 for all floats that could be processed. Bad data points have been removed. With the exception of a few floats, very little interpolation was necessary in the trajectory calculations because of the high quality of the acoustic data. The VOCHA data for each float are plotted on each facing page, showing the temperature and pressure on the lower, middle and upper isopycnal surfaces. The "delta T" and "delta P" plots show the differences between the upper and middle (top line), lower and middle (bottom line), and two middle positions at the start and end of the VOCHA cycle (middle line). The results of a five-point median filter are shown as the broad, light gray lines in each of these "delta" plots. In a few floats (e.g. 261, 262), the VOCHA stopped operating before the end of the float's mission, as seen in these floats' incomplete VOCHA data plots. The float plots are arranged in numerical order. Tables 2a-c chronologically list the floats launched in groups 1, 2 and 3, respectively. Launch and surface information, mission length in days, and nominal (target) and estimated middle σ_t surfaces are listed, along with the corresponding CTD or XBT at each launch site. Explanatory notes, where needed, follow the float listings in each table. Figures 3a and 3b are spaghetti plots of all float trajectories on the 27.2 σ_t and

27.5 σ_t surfaces, respectively. The final section contains time series plots of float trajectories at ten day intervals beginning July 21-30, 1993, and ending June 21-30, 1995. The dots on each trajectory segment are the daily positions during the ten day interval. The open circles represent the end points for the shallow floats, the closed circles the end points for the deep floats, in each time span. The float number is shown at the beginning of the ten day trajectory where space permits. The bathymetric contours in these and all other figures are at 200m, 1000m, 2500m and 4000m.

7. Acknowledgements

First we would like to thank Mr. James Fontaine for building and testing all the floats for this program. The high success rate for these floats certainly attests to his skill and expertise. We thank Mr. John Kemp, Mr. Tom Orvosh, and the crew of the R/V *Oceanus* for their excellent work preparing and deploying the sound source moorings, and for their assistance with the first group of float launches. We also acknowledge Dr. Allyn Clarke of the Bedford Institute of Oceanography for allowing us ship time on the CSS *Hudson* for our second and third float deployments. Dr. Edward Kearns, Mr. Clark Rowley and Dr. Mary-Elena Carr assisted in the float setup and launches in the first, second and third deployments, respectively. We also appreciate their help during the ballasting of the floats, along with the help of Ms. Stephanie Dutkiewicz and Dr. Jules Hummon. We thank the captain and crew of the *Hudson* for their willing and expert assistance with the float launches, and for their later recovery of the sound source moorings. We also thank Dr. Randy Watts of URI and Dr. Allyn Clarke for their assistance and supervision during the mooring recoveries. Dr. Mary-Elena Carr calculated the floats' estimated σ_t surfaces for inclusion in this report. This work was supported by the National Science Foundation and the Office of Naval Research. It was administered by ONR under grant number N00014-92J-1651.

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Table 1. Newfoundland Basin sound sources

Source (Mooring) number	Deployment date	Latitude (N)	Longitude (W)	Transmission times (GMT)	Drift rate (sec/day)
1 (M1)	7/13/93	42.948	35.973	00:30,12:30	-0.0030
2 (M3)	7/16/93	47.570	37.915	01:00,13:00	-0.0030
3 (M2)	7/15/93	46.968	31.947	01:30,13:30	-0.0030
4 (M4)	7/18/93	51.049	35.947	02:00,14:00	0.0240

Table 2a. Float summary: group 1 (summer 1993)

Float number	Launch Lat(N)	Launch Lon(W)	Surface Lat(N)	Surface Lon(W)	Launch yearday	(date)	Mission length	Nominal sigma-t	Estimated sigma-t	CTD # (x=XBT)
268	48.34	42.85	53.36	50.05	201.94	(Jul 20)	300	27.5	27.56	8
*261	48.34	42.85	52.37	41.85	201.94	(Jul 20)	210	27.2	27.28	8
251	48.40	42.45	no show		202.14	(Jul 21)	300	27.5	---	9
264	48.40	42.45	50.06	16.48	202.14	(Jul 21)	300	27.2	27.19	9
258	48.43	41.31	46.75	37.44	202.56	(Jul 21)	300	27.5	27.58	11
263	48.43	41.31	51.36	40.34	202.56	(Jul 21)	300	27.2	27.21	11
278	46.32	42.62	no show		203.83	(Jul 22)	300	27.5	---	14
280	46.32	42.61	47.65	29.03	203.84	(Jul 22)	300	27.2	27.29	14
252	46.10	42.28	50.60	43.98	204.07	(Jul 23)	60	27.2	27.24	15
259	46.10	42.28	46.51	38.11	204.08	(Jul 23)	60	27.2	27.20	15
281	46.10	42.28	44.36	36.67	204.08	(Jul 23)	300	27.2	---	15
**271	46.10	42.28	36.54	17.94	204.08	(Jul 23)	300	27.5	---	15
275	45.00	41.03	46.06	37.72	205.02	(Jul 24)	300	27.2	27.18	19
277	45.00	41.03	52.36	47.65	205.02	(Jul 24)	300	27.5	27.62	19
260	42.99	43.98	42.91	45.29	205.75	(Jul 24)	300	27.2	27.32	20
272	42.99	43.98	45.96	43.49	205.75	(Jul 24)	300	27.5	27.57	20
270	43.36	46.36	39.77	44.97	206.22	(Jul 25)	60	27.2	---	89(x)
274	43.36	46.36	39.12	45.28	206.22	(Jul 25)	60	27.2	---	89(x)
256	43.60	46.51	43.08	32.30	206.39	(Jul 25)	300	27.5	27.50	21
*266	43.60	46.51	52.21	23.81	206.39	(Jul 25)	210	27.2	---	21
255	43.13	49.02	43.37	37.06	213.02	(Aug 1)	300	27.5	27.66	22
*262	43.13	49.02	51.45	39.29	213.02	(Aug 1)	210	27.2	27.32	22
257	42.27	45.59	40.95	38.70	217.09	(Aug 5)	300	27.5	27.47	31
267	42.27	45.59	38.21	50.27	217.09	(Aug 5)	300	27.2	27.29	31
276	40.96	41.68	36.06	43.47	219.19	(Aug 7)	300	27.2	27.29	38
269	42.20	45.59	49.10	33.06	220.21	(Aug 8)	300	27.5	---	103(x)
279	42.20	45.59	30.31	42.96	220.21	(Aug 8)	300	27.2	---	103(x)
250	42.45	46.22	no show		220.45	(Aug 8)	300	27.2	---	105(x)
254	42.45	46.22	46.62	30.14	220.45	(Aug 8)	300	27.5	---	105(x)
265	42.45	46.22	44.34	34.34	220.46	(Aug 8)	300	27.5	---	105(x)
273	42.45	46.22	53.98	42.78	220.46	(Aug 8)	300	27.2	---	105(x)
253	42.48	46.34	45.76	43.40	220.60	(Aug 8)	57	27.5	---	42

Notes:

* sudden jump to surface before end of mission.

** lost ballast weight soon after launch, so on surface through entire mission.

Float 253: mission ended prematurely after 57 days (originally programmed for 300 days).

Float 281: no acoustic data, limited pressure/temperature data.

Surface position is the first position as recorded by Argos.

Table 2b. Float summary: group 2 (fall 1993)

Float number	Launch Lat(N)	Launch Lon(W)	Surface Lat(N)	Surface Lon(W)	Launch yearday	(date)	Mission length	Nominal sigma-t	Estimated sigma-t	CTD # (x=XBT)
285	42.28	45.58	43.90	42.70	331.82	(Nov 27)	300	27.5	27.38	34
**289	42.27	45.57	41.24	21.41	331.83	(Nov 27)	300	27.2	27.05	34
288	42.45	46.39	51.35	42.05	332.26	(Nov 28)	300	27.5	---	35
*318	42.45	46.38	49.25	16.20	332.26	(Nov 28)	300	27.2	27.11	35
***302	42.62	46.82	47.49	12.42	332.59	(Nov 28)	180	27.2	---	36
307	42.62	46.82	52.74	36.60	332.62	(Nov 28)	180	27.5	---	36
*292	42.67	47.26	-------		332.89	(Nov 28)	300	27.2	27.09	37
295	43.03	48.48	42.84	40.59	333.36	(Nov 29)	300	27.5	27.46	39
322	43.03	48.48	43.10	41.62	333.36	(Nov 29)	57	27.2	27.23	39
282	45.36	47.63	51.25	40.44	334.90	(Nov 30)	300	27.5	27.44	49
303	45.37	47.63	50.90	38.04	334.90	(Nov 30)	300	27.2	27.21	49
314	44.39	45.98	50.93	43.68	335.67	(Dec 1)	300	27.5	27.47	49
*299	44.39	45.98	42.60	21.76	335.67	(Dec 1)	300	27.2	27.19	53
315	44.28	45.21	55.37	49.96	335.93	(Dec 1)	300	27.5	27.46	54
*312	44.28	45.21	48.47	15.65	335.93	(Dec 1)	300	27.2	27.18	54
309	43.70	41.74	51.17	30.66	337.51	(Dec 3)	300	27.5	27.43	59
**284	43.70	41.74	54.39	21.66	337.51	(Dec 3)	300	27.2	27.18	59
323	43.56	41.01	40.86	34.94	337.77	(Dec 3)	300	27.5	---	60
*305	43.56	41.00	43.18	17.23	337.77	(Dec 3)	300	27.2	26.93	60
301	43.40	40.32	34.80	53.14	338.00	(Dec 4)	300	27.2	---	61
321	43.40	40.32	51.12	38.57	338.00	(Dec 4)	300	27.5	---	61
306	44.13	40.56	42.32	40.03	338.87	(Dec 4)	300	27.5	27.42	64
**286	44.13	40.56	49.04	28.05	338.87	(Dec 4)	300	27.2	27.10	64
311	45.85	42.50	61.29	30.13	339.86	(Dec 5)	300	27.5	---	68
**316	45.85	42.49	39.89	30.85	339.87	(Dec 5)	300	27.2	27.11	68
298	46.45	43.18	55.14	40.47	340.31	(Dec 6)	300	27.5	27.36	70
319	46.46	43.19	no	show	340.31	(Dec 6)	300	27.2	---	70
300	47.05	46.75	45.15	43.58	342.07	(Dec 8)	300	27.5	27.46	86
317	47.06	43.40	41.60	33.52	342.72	(Dec 8)	300	27.5	---	89
291	47.03	42.28	62.56	27.97	343.18	(Dec 9)	300	27.2	27.31	92
320	47.03	42.24	53.84	31.13	343.18	(Dec 9)	300	27.5	27.40	92
296	46.69	40.52	44.17	38.48	343.84	(Dec 9)	300	27.5	27.35	95
313	46.69	40.52	50.34	24.44	343.84	(Dec 9)	300	27.2	27.07	95
283	46.21	40.11	50.35	40.87	344.07	(Dec 10)	300	27.5	27.30	96
*304	46.21	40.12	44.35	17.94	344.07	(Dec 10)	300	27.2	26.90	96
290	42.14	45.01	46.14	28.59	347.79	(Dec 13)	300	27.2	---	105
**308	42.22	45.42	41.87	31.93	347.85	(Dec 13)	300	27.2	---	--
310	42.36	45.98	46.29	38.42	347.99	(Dec 13)	300	27.2	---	107
287	42.46	46.51	41.79	30.99	348.08	(Dec 14)	300	27.2	---	--
294	42.53	47.05	45.39	32.56	348.20	(Dec 14)	300	27.2	---	109
*293	42.53	47.04	50.13	20.95	348.20	(Dec 14)	300	27.2	---	109

Notes:

* gradually rose to surface (due to shoaling of the density surface) and remained there for the last 5 to 7 months of the mission. (292 was picked up by a fisherman off the coast of Ireland while still in mission, with a corroded release wire.)

** sudden jump to surface before end of mission (284 and 286 less than 8 days from end).

*** lost ballast weight during launch, so on surface through entire mission.

Float 322: mission ended prematurely after 57 days (originally programmed for 300 days).

Float 288: vocha stopped after 1.5 days.

Float 290: transmitted no usable data; recovered in England July 20, 1996.

Float 317: transmitted only 10% of its data, was untrackable.

Float 291: apparent problem with temperature sensor, days 49-56.

Surface position is the first position as recorded by Argos.

Table 2c. Float summary: group 3 (fall 1994)

Float number	Launch Lat(N)	Launch Lon(W)	Surface Lat(N)	Surface Lon(W)	Launch yearday	(date)	Mission length	Nominal sigma-t	Estimated sigma-t	CTD # (x=XBT)
330	41.74	44.29	42.82	32.73	296.02	(Oct 23)	240	27.2	27.15	32
329	42.44	46.19	46.56	41.35	296.76	(Oct 23)	240	27.2	---	35
332	42.44	46.19	40.72	31.97	296.76	(Oct 23)	240	27.5	27.39	35
324	42.63	46.86	42.31	37.22	297.03	(Oct 24)	240	27.2	27.15	36
328	42.63	46.86	53.53	24.62	297.03	(Oct 24)	240	27.2	27.13	36
333	42.63	46.86	47.65	40.31	297.03	(Oct 24)	240	27.5	27.37	36
339	42.63	46.86	55.17	42.94	297.03	(Oct 24)	240	27.5	27.33	36
340	43.03	48.41	37.62	53.48	297.61	(Oct 24)	240	27.2	27.17	39
343	43.04	48.41	42.77	36.47	297.61	(Oct 24)	240	27.5	27.48	39
341	44.66	42.44	49.02	34.31	304.46	(Oct 31)	240	27.5	27.43	76
351	44.66	42.44	49.61	33.57	304.46	(Oct 31)	240	27.2	27.10	76
297	44.84	42.65	48.97	27.10	304.59	(Oct 31)	240	27.5	---	77(x)
347	44.84	42.66	47.32	33.59	304.59	(Oct 31)	240	27.5	---	77(x)
325	44.84	42.66	51.04	27.73	304.60	(Oct 31)	240	27.2	---	77(x)
336	44.84	42.66	50.90	32.38	304.60	(Oct 31)	240	27.2	---	77(x)
331	45.43	43.08	51.92	30.59	305.09	(Nov 1)	240	27.5	27.45	80
344	45.43	43.08	52.45	28.67	305.09	(Nov 1)	240	27.2	27.25	80
326	46.94	42.35	52.00	27.23	306.96	(Nov 2)	240	27.5	27.45	94
345	46.94	42.35	43.43	39.69	306.96	(Nov 2)	240	27.2	27.12	94
334	46.92	41.71	50.93	39.87	307.17	(Nov 3)	240	27.5	27.38	95
349	46.92	41.71	49.75	44.26	307.17	(Nov 3)	240	27.2	---	95
352	46.92	41.71	48.89	29.44	307.17	(Nov 3)	240	27.2	27.13	95
342	46.92	41.71	48.52	20.91	307.18	(Nov 3)	240	27.5	26.86	95
335	45.91	40.80	49.66	31.39	307.83	(Nov 3)	240	27.2	27.18	98
337	45.91	40.80	46.09	40.73	307.83	(Nov 3)	240	27.5	27.39	98
338	42.59	46.87	------		311.07	(Nov 7)	240	27.2	---	108(x)
348	42.59	46.87	32.03	39.13	311.07	(Nov 7)	240	27.2	---	108(x)

Notes:

Float 338: surfaced one day after launch (mission ended prematurely).

Float 342: surfaced after 70 days, remained on surface through remainder of mission.

Surface position is the first position as recorded by Argos.

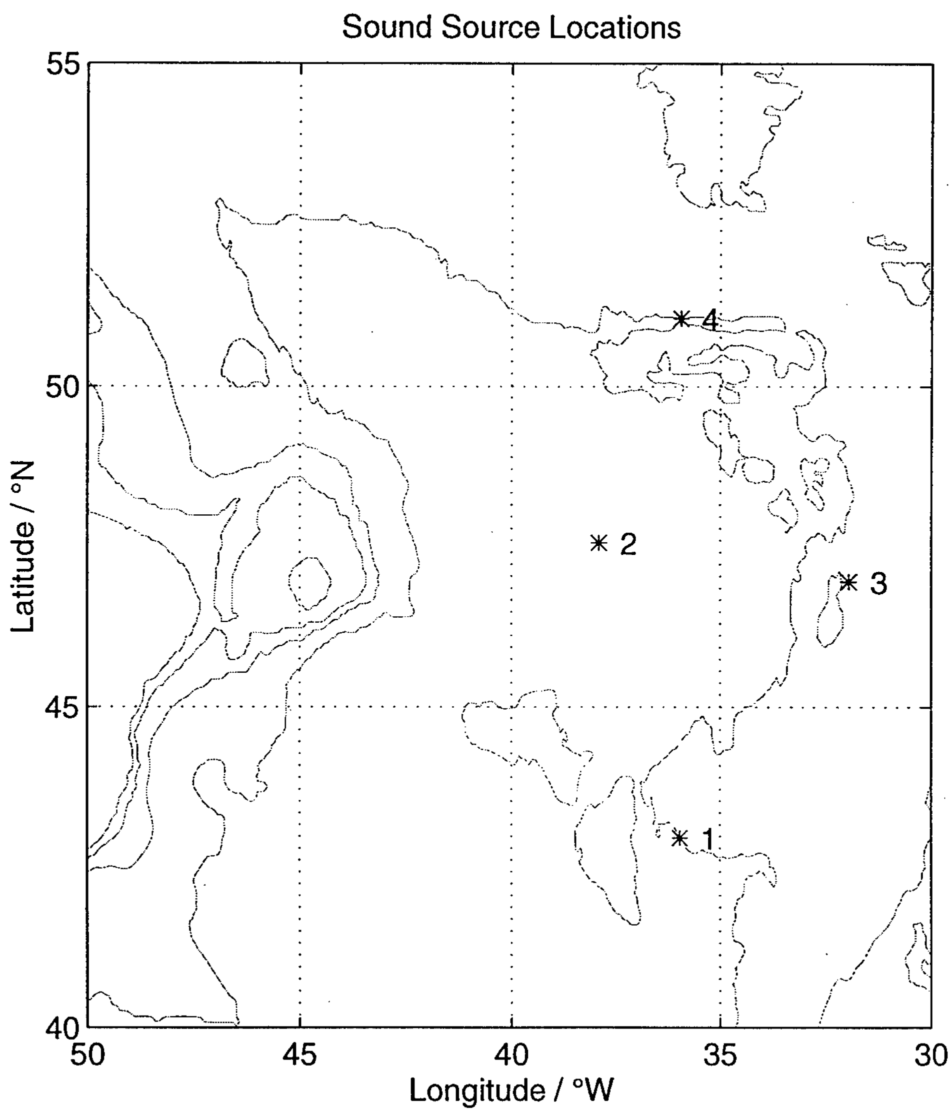


Figure 1. Newfoundland Basin sound source locations. See Table 1 for additional information.

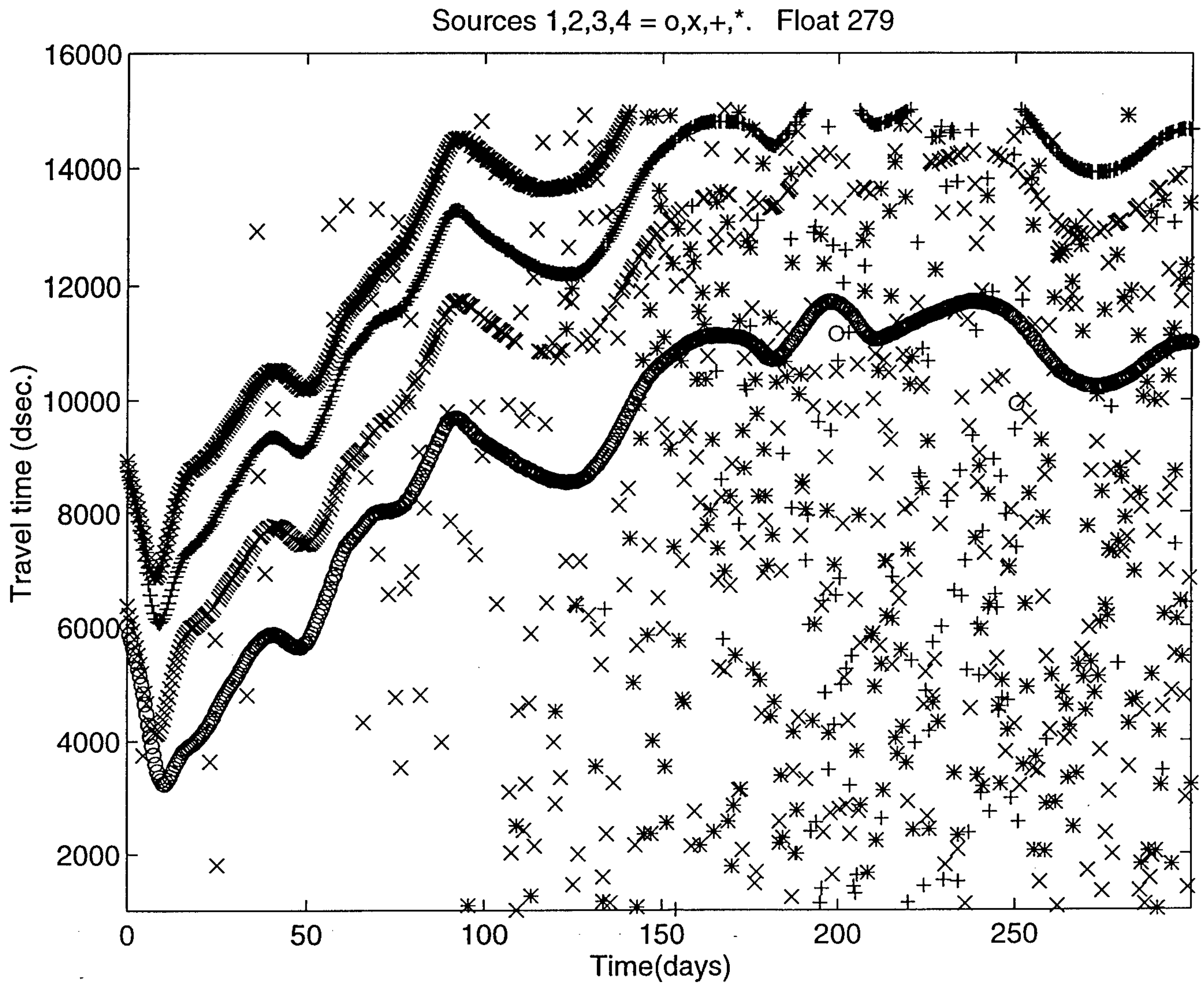


Figure 2. Sound source travel times (deciseconds) for float 279. Time axis is elapsed time in days. The cutoff at 15000 dsec is the end of the 25 minute listening window. The symbols used for the four sources are defined at the top of the figure.

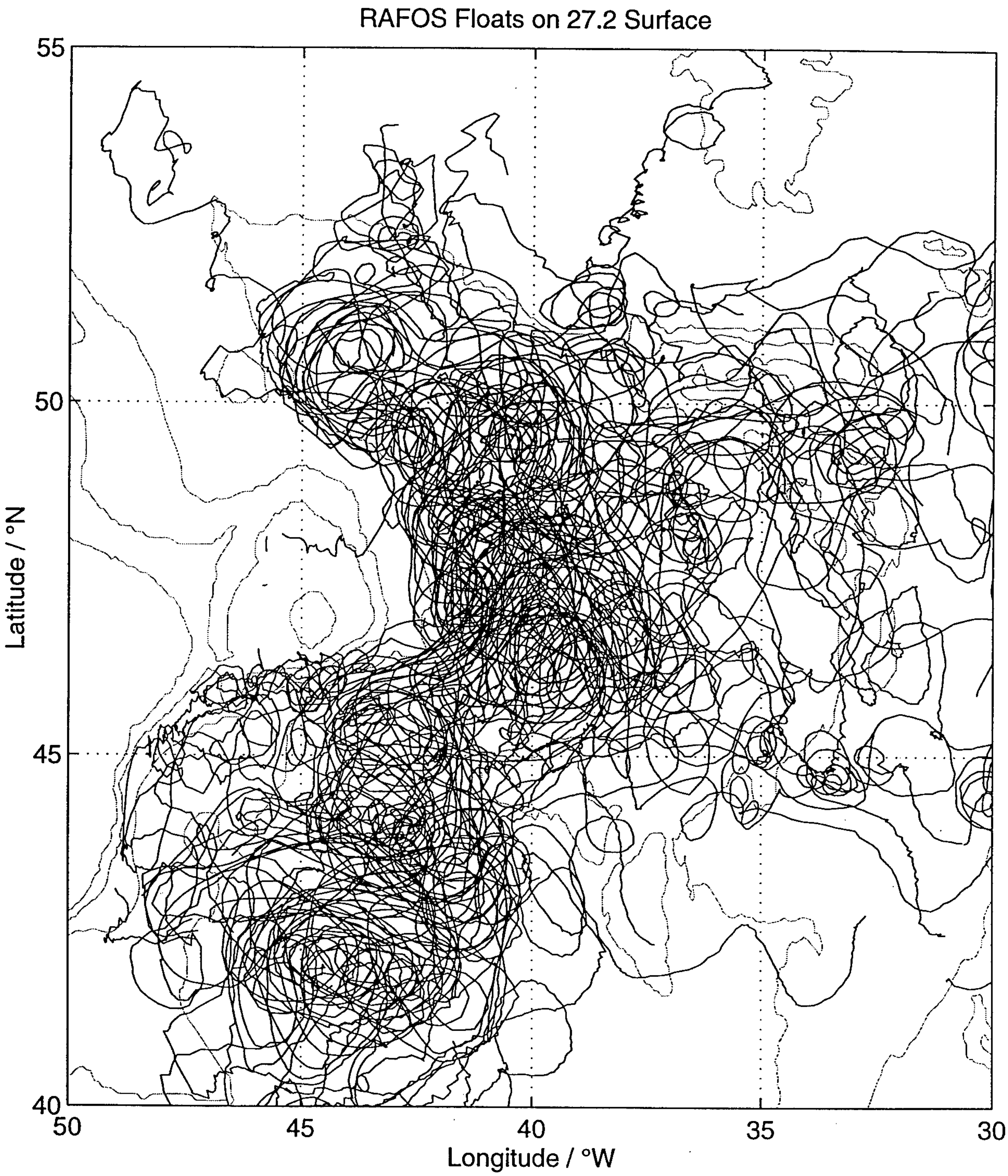


Figure 3a. Spaghetti plot of all floats targeted for the 27.2 σ_t surface. Floats from all three deployments are included.

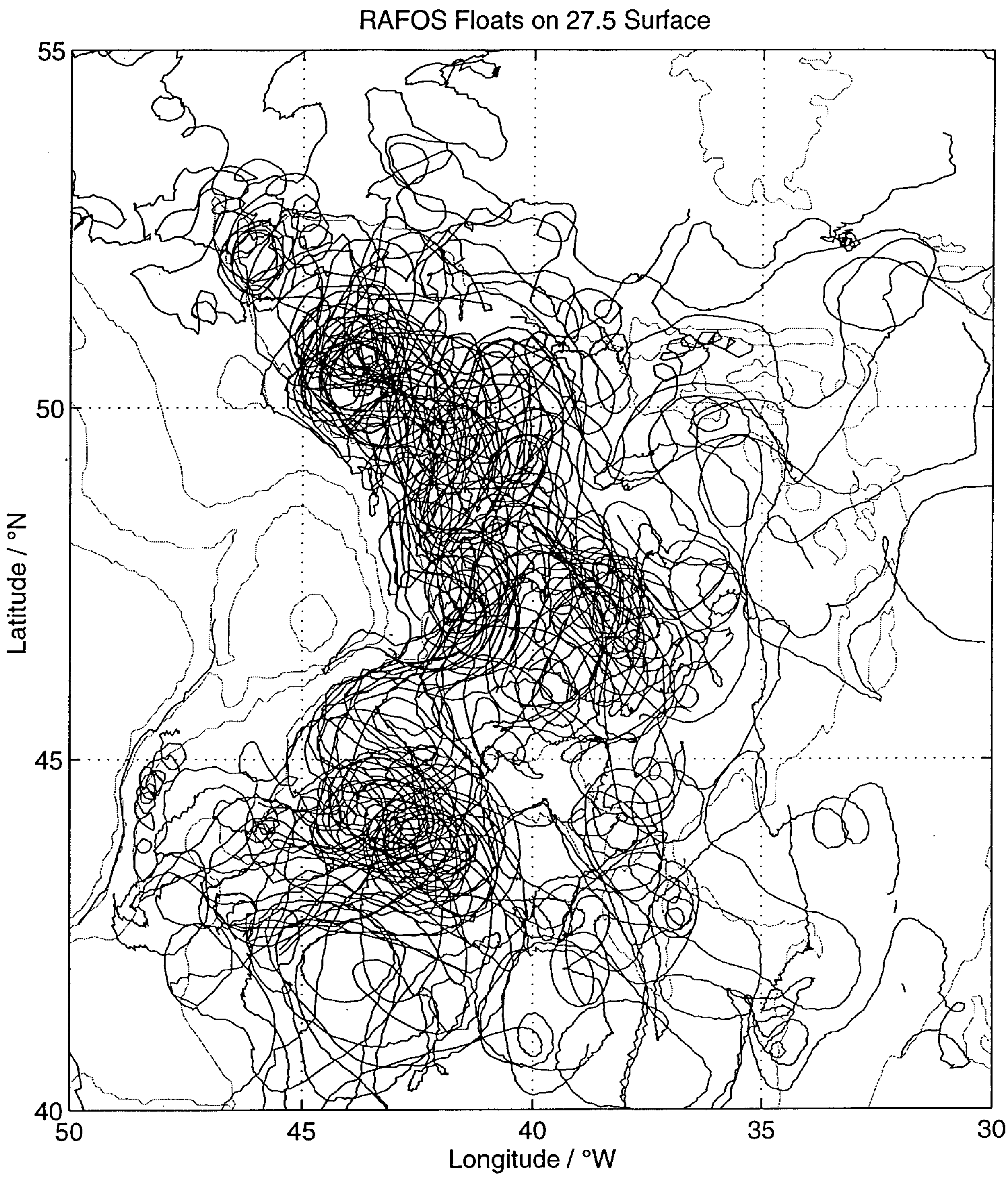
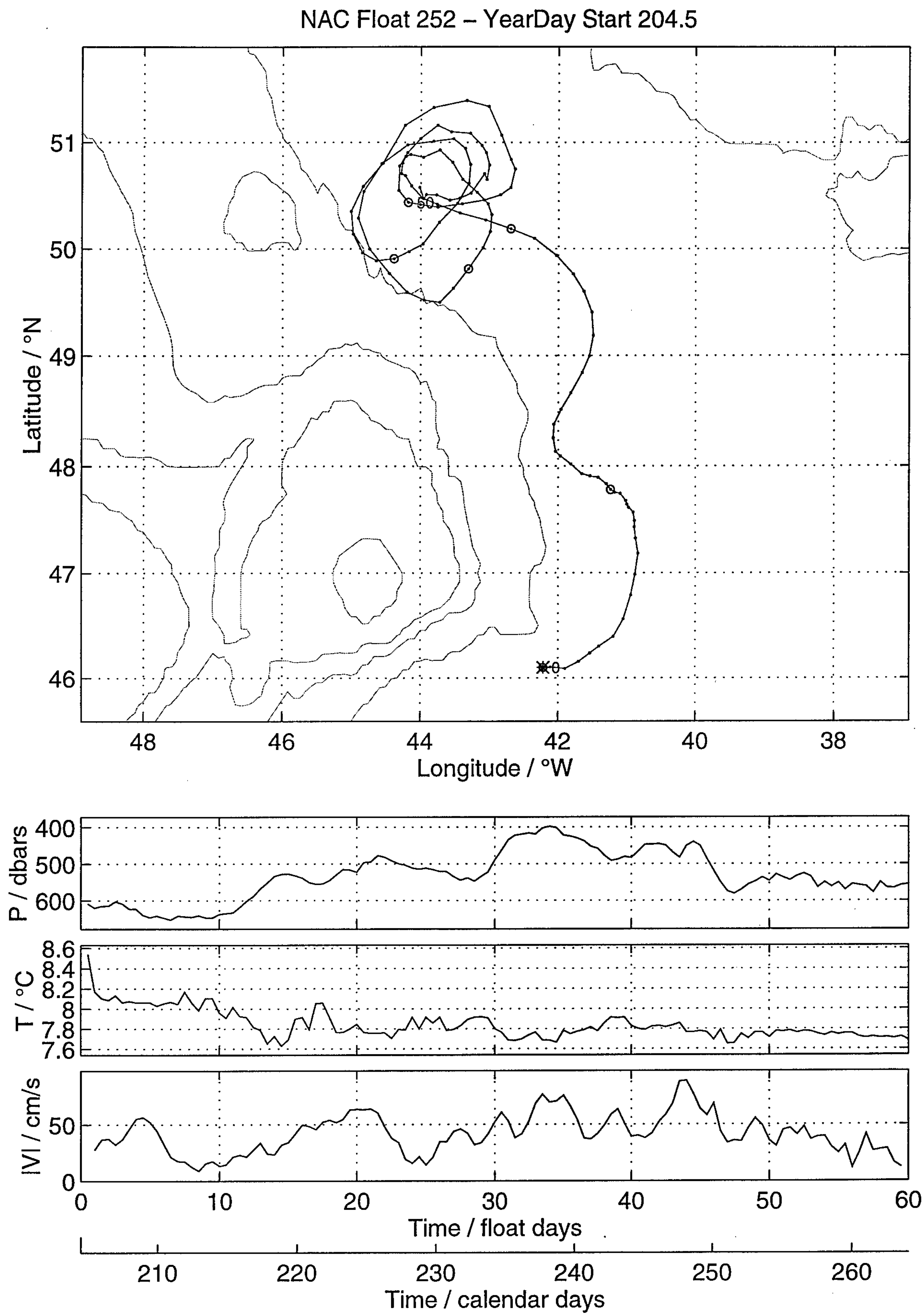
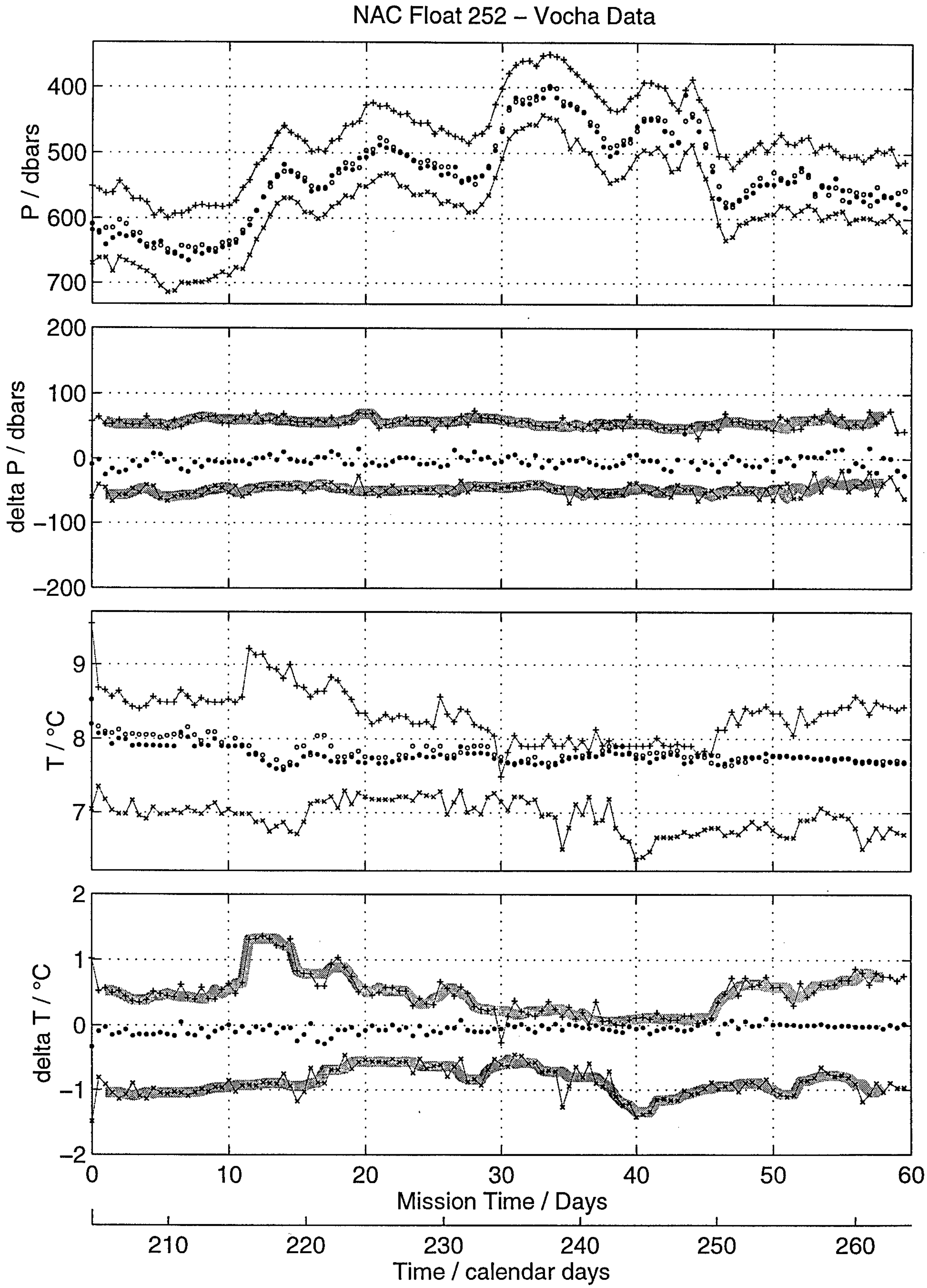
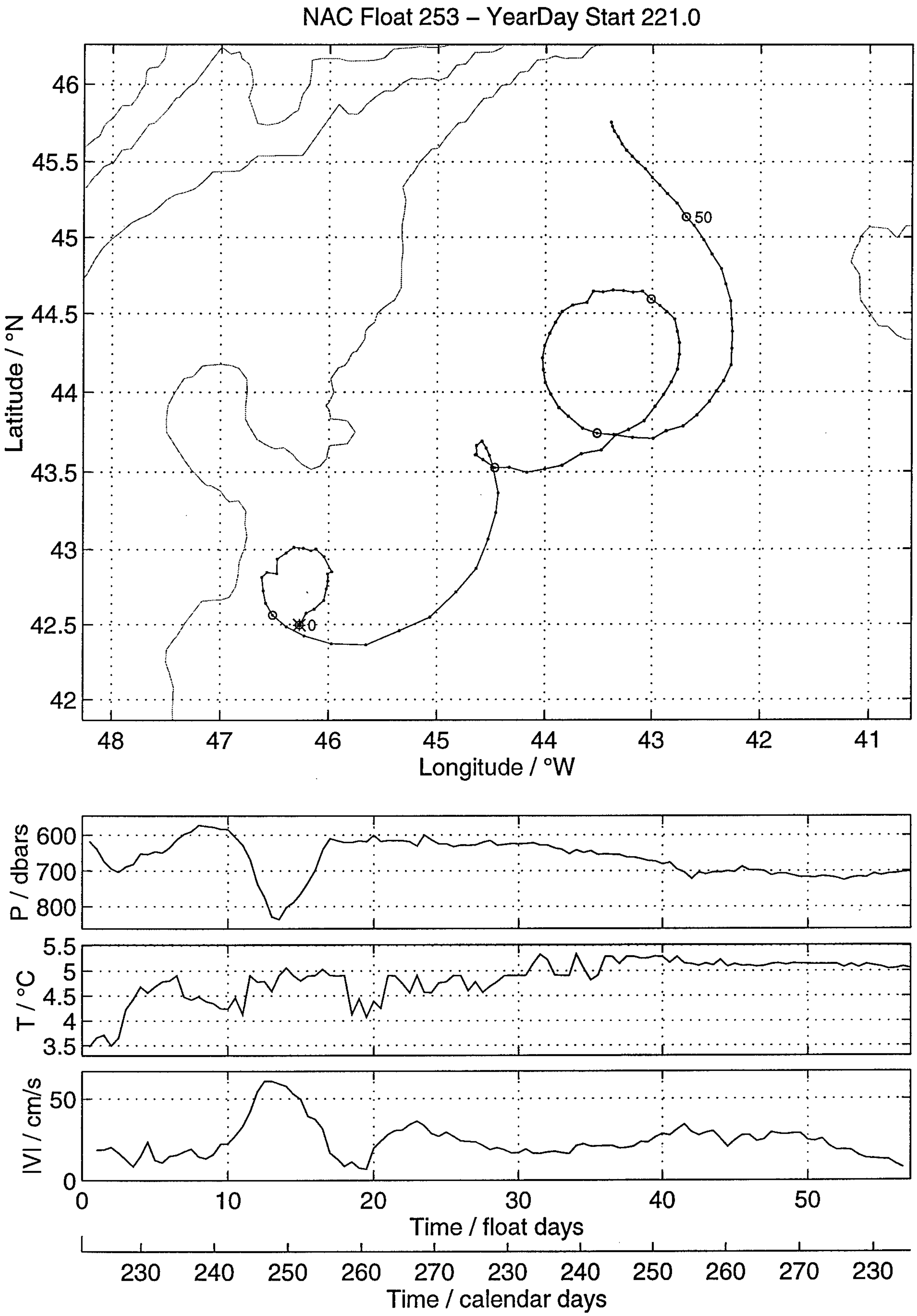


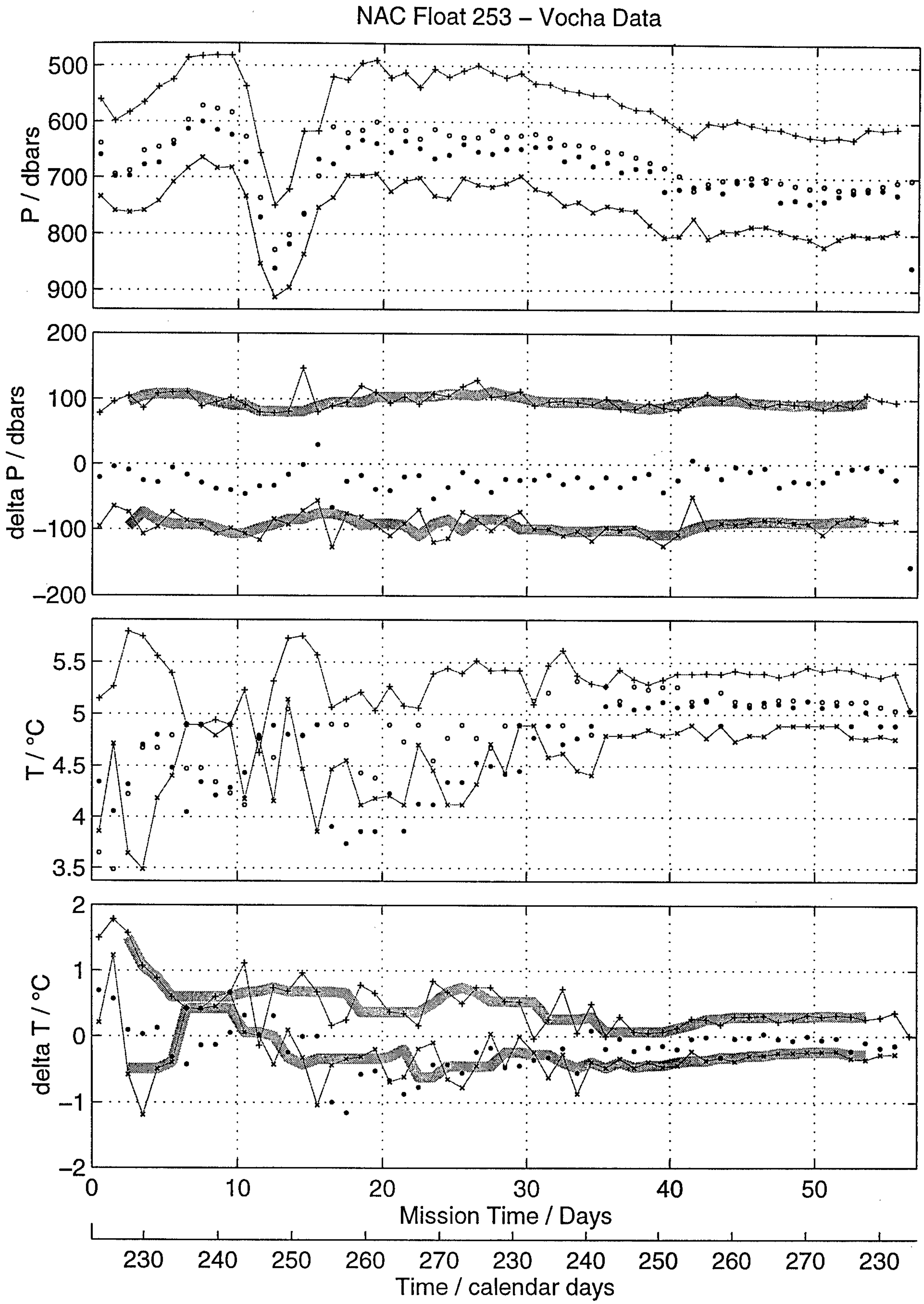
Figure 3b. Spaghetti plot of all floats targeted for the 27.5 σ_t surface. Floats from all three deployments are included.

9. RAFOS Float Data


NAC Float 252 – YearDay Start 204.5
Latitude / °N
Longitude / °W
51
50
49
48
47
46
48
46
44
42
40
38
50
0
P / dbars
400
500
600
T / °C
8.6
8.4
8.2
8
7.8
7.6
|V| / cm/s
50
0
0
10
20
30
40
50
60
Time / float days
210
220
230
240
250
260
Time / calendar days

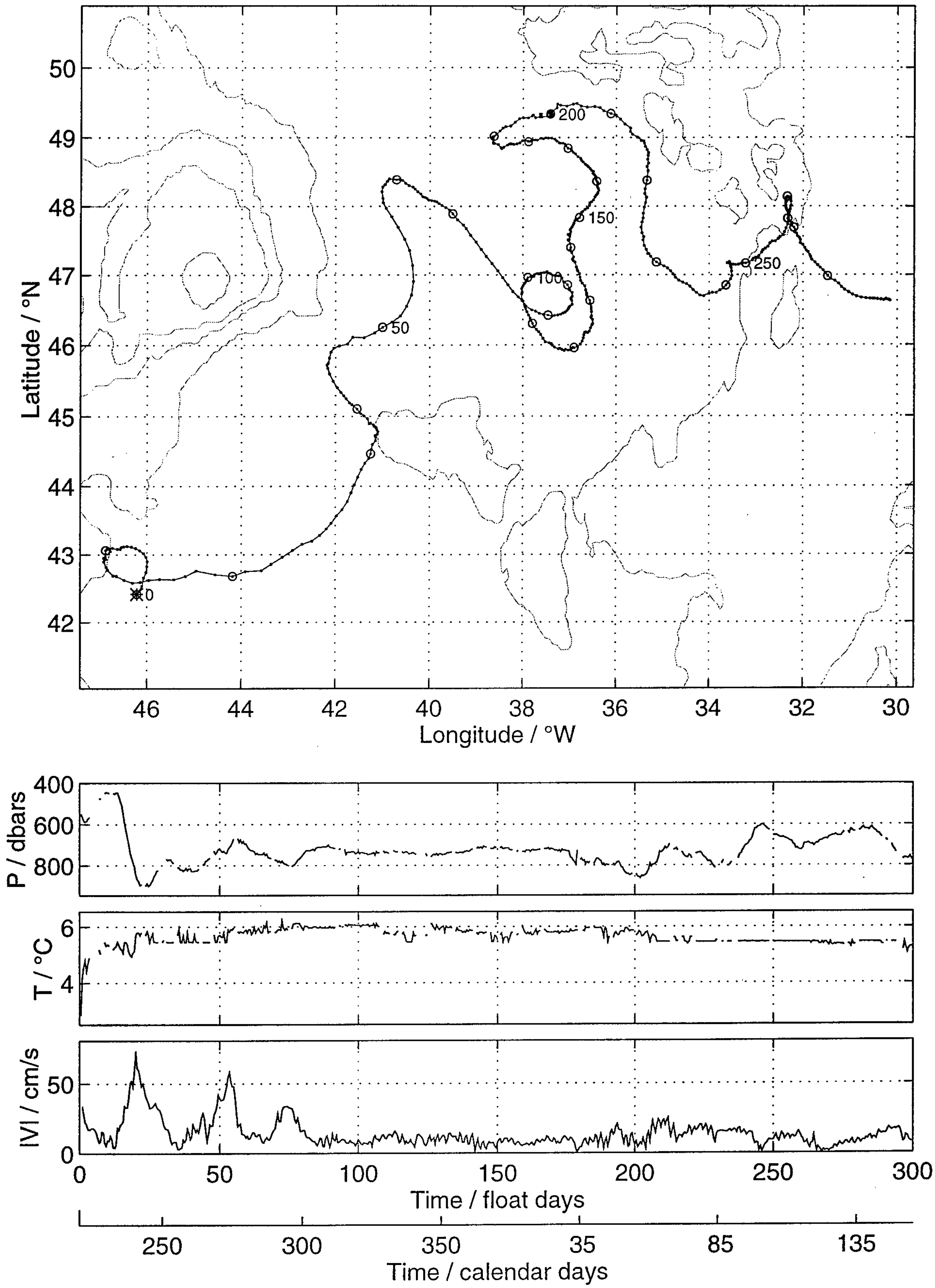

NAC Float 252 – Vocha Data
P / dbars
400
500
600
700
delta P / dbars
200
100
0
−100
−200
T / °C
9
8
7
delta T / °C
2
1
0
−1
−2
0
10
20
30
40
50
60
Mission Time / Days
210
220
230
240
250
260
Time / calendar days


NAC Float 253 – YearDay Start 221.0
Latitude / °N
Longitude / °W
46
45.5
45
44.5
44
43.5
43
42.5
42
48
47
46
45
44
43
42
41
50
0
P / dbars
600
700
800
T / °C
5.5
5
4.5
4
3.5
|V| / cm/s
50
0
0
10
20
30
40
50
Time / float days
230
240
250
260
270
230
240
250
260
270
230
Time / calendar days

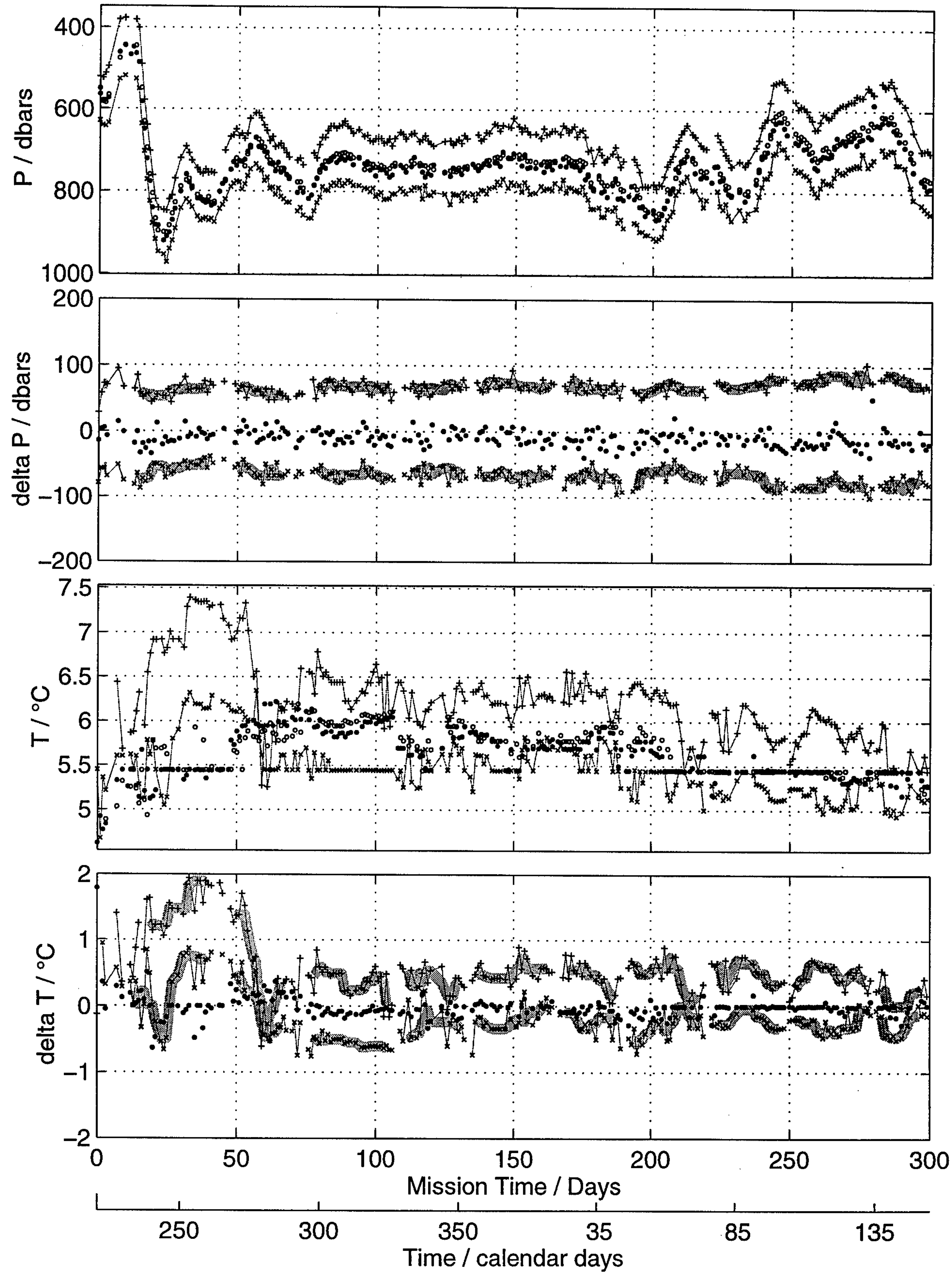


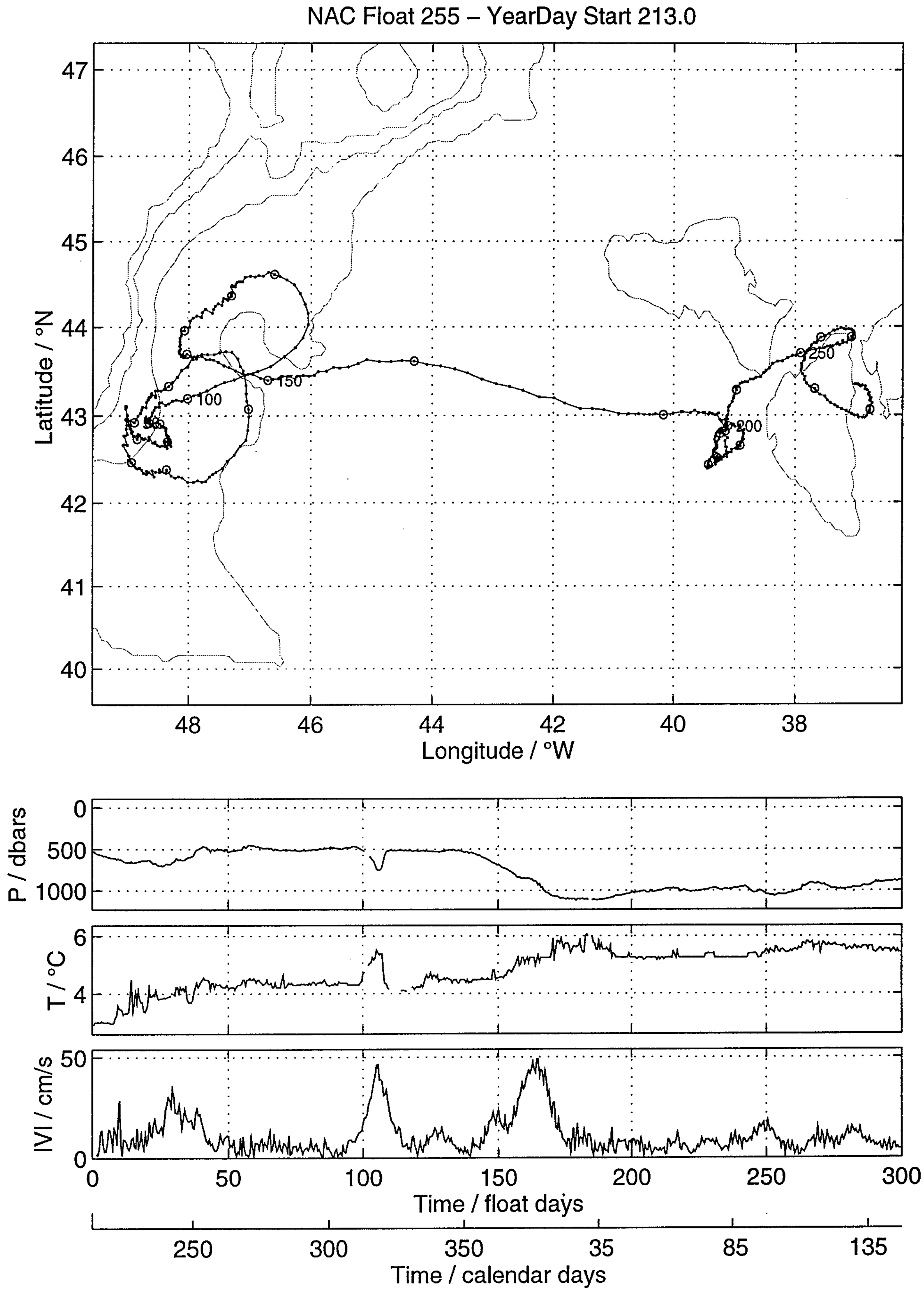
NAC Float 253 – Vocha Data
P / dbars
500
600
700
800
900
delta P / dbars
200
100
0
−100
−200
T / °C
5.5
5
4.5
4
3.5
delta T / °C
2
1
0
−1
−2
0
10
20
30
40
50
Mission Time / Days
230
240
250
260
270
230
240
250
260
270
230
Time / calendar days

NAC Float 254 – YearDay Start 220.5

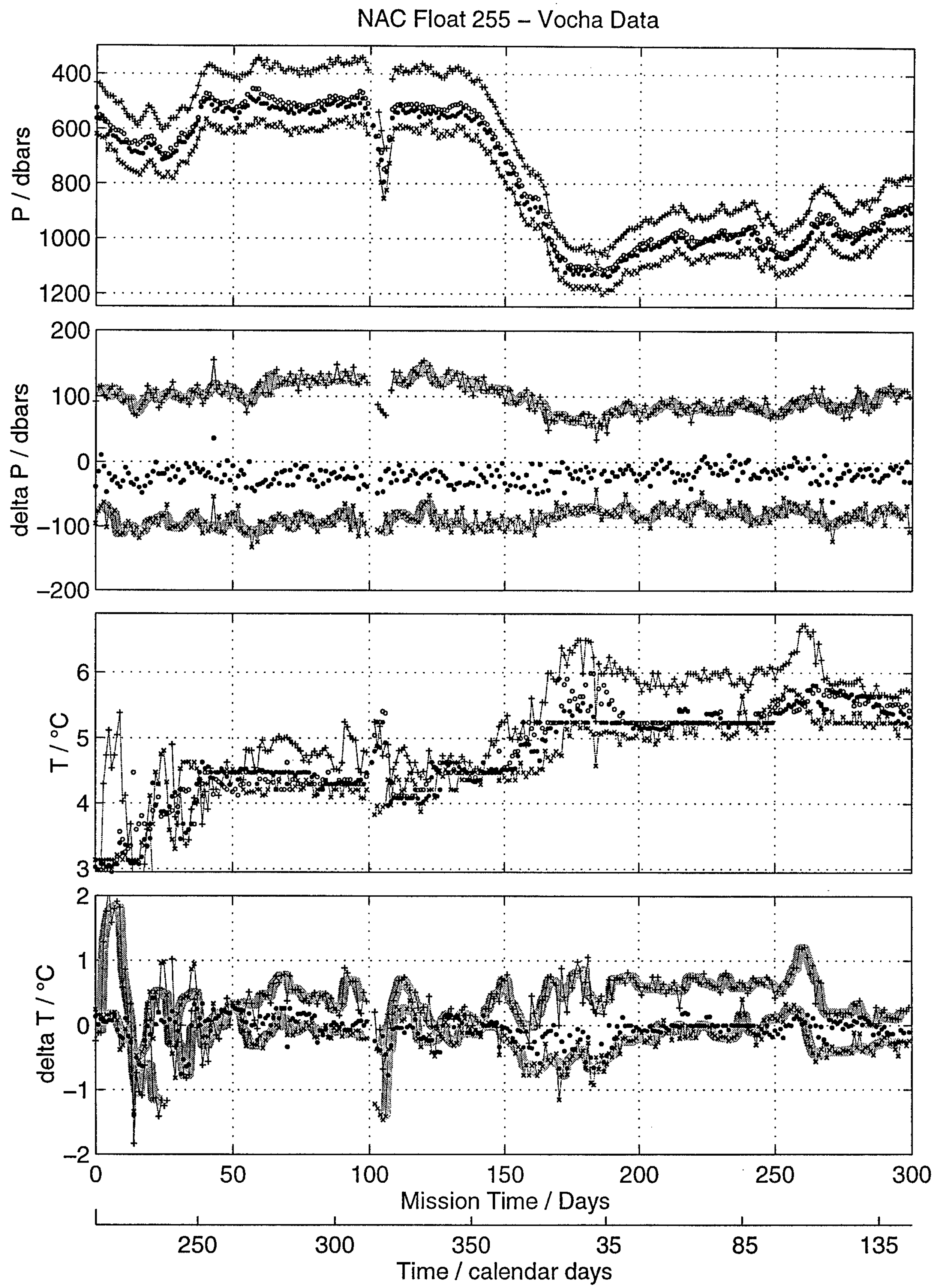


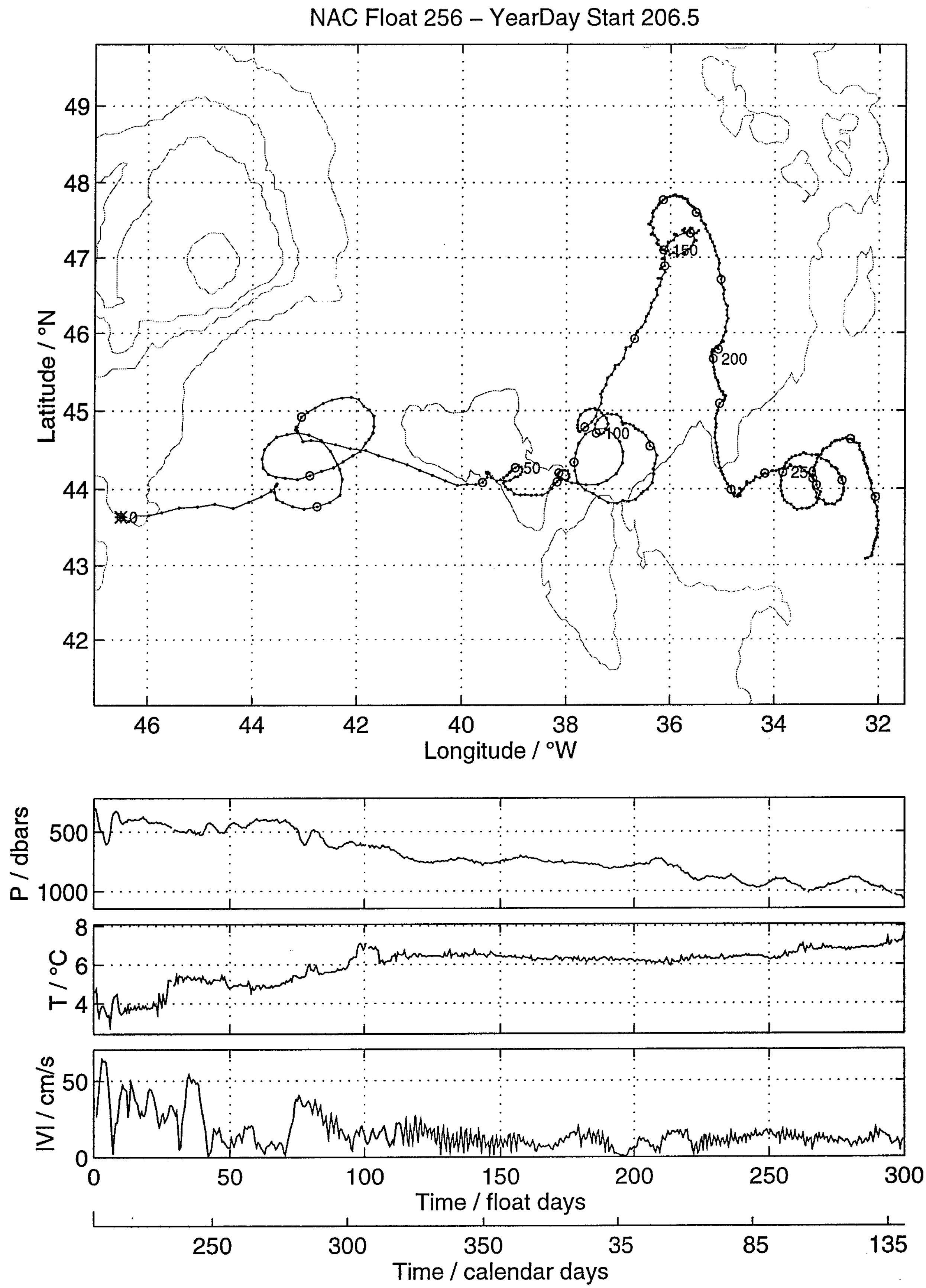
NAC Float 254 – Vocha Data

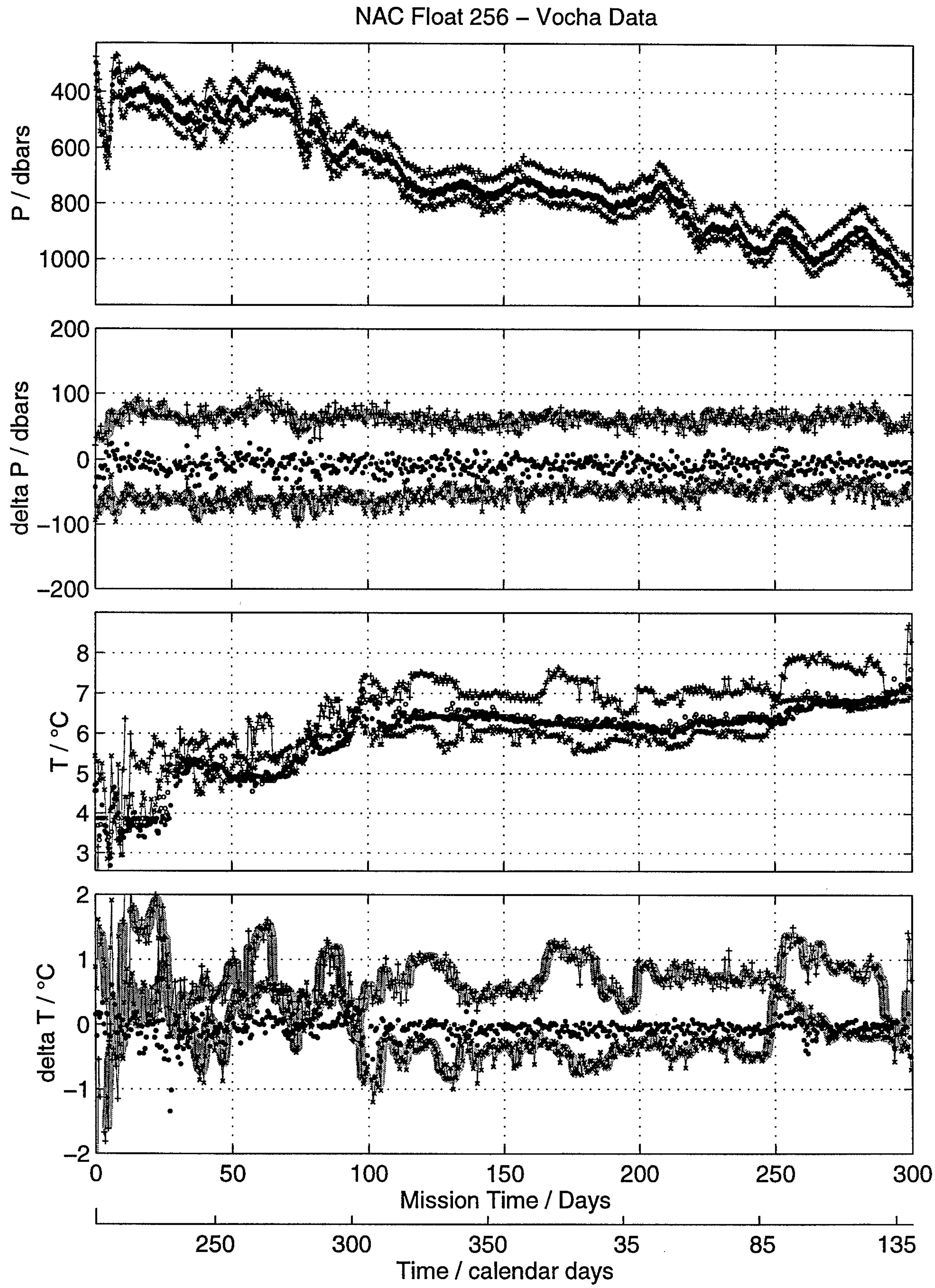


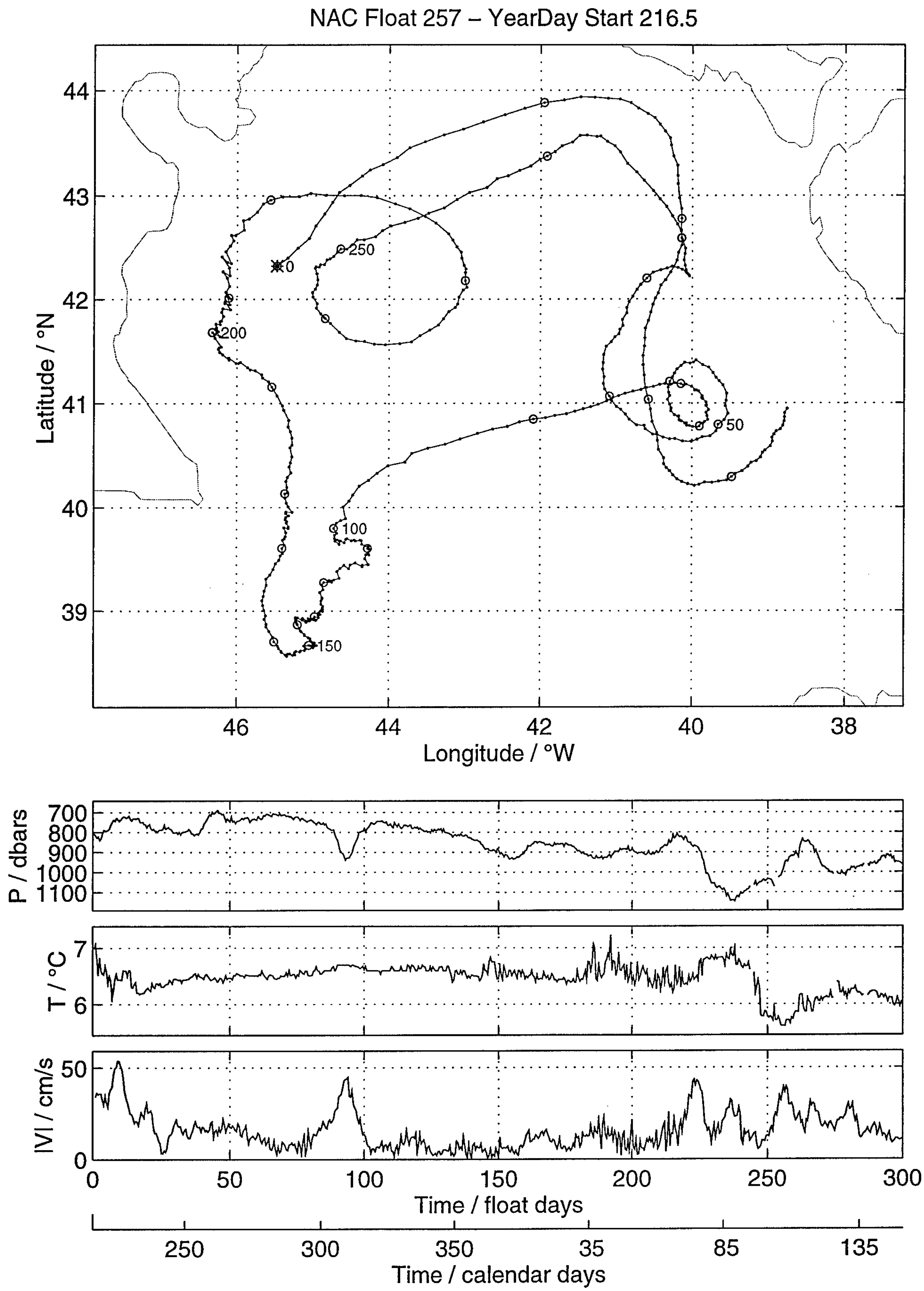


NAC Float 255 – YearDay Start 213.0
Latitude / °N
Longitude / °W
47
46
45
44
43
42
41
40
48
46
44
42
40
38
100
150
200
250
P / dbars
0
500
1000
T / °C
6
4
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
250
300
350
35
85
135
Time / calendar days

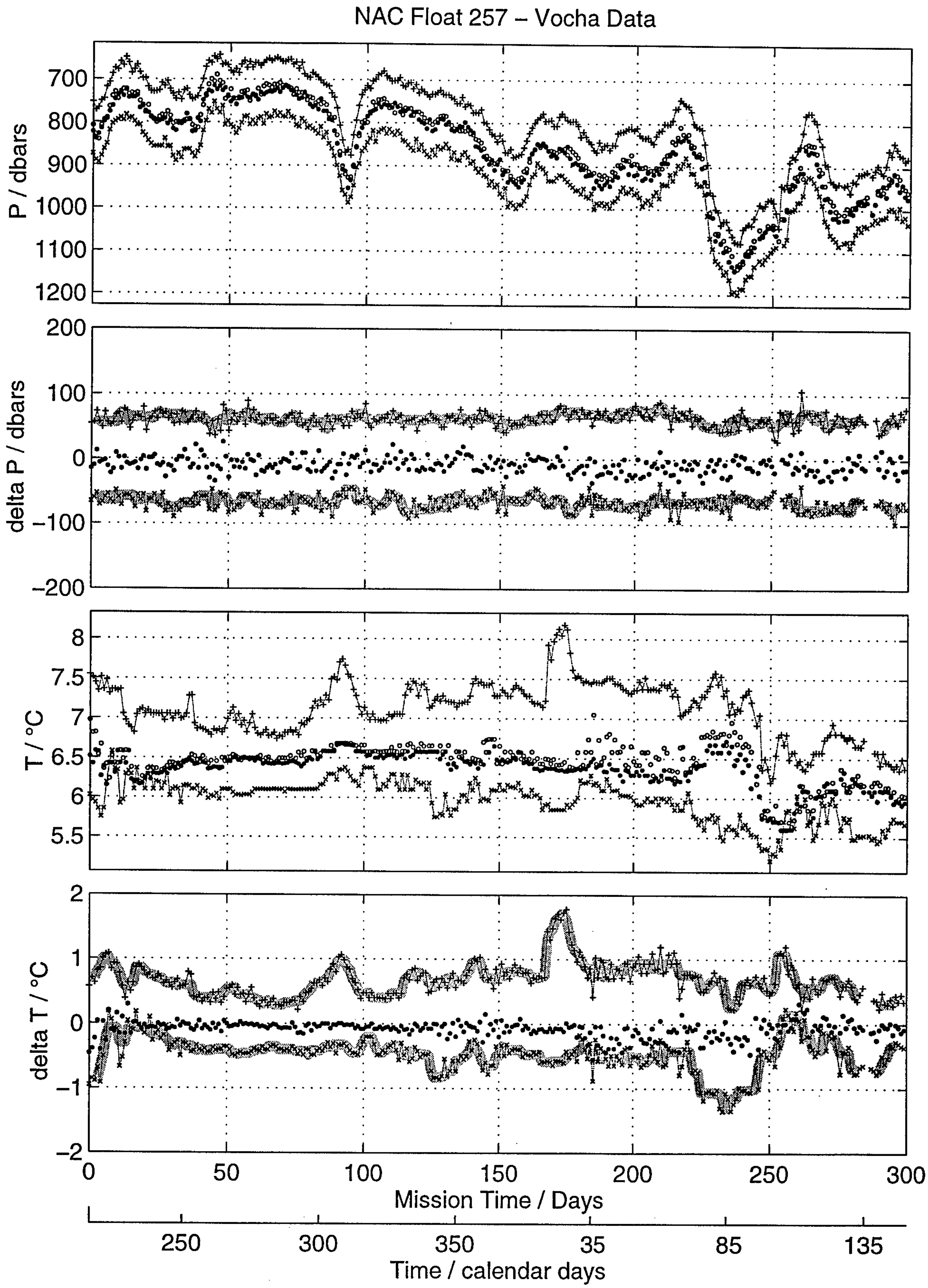

NAC Float 255 – Vocha Data
P / dbars
400
600
800
1000
1200
delta P / dbars
200
100
0
−100
−200
T / °C
6
5
4
3
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

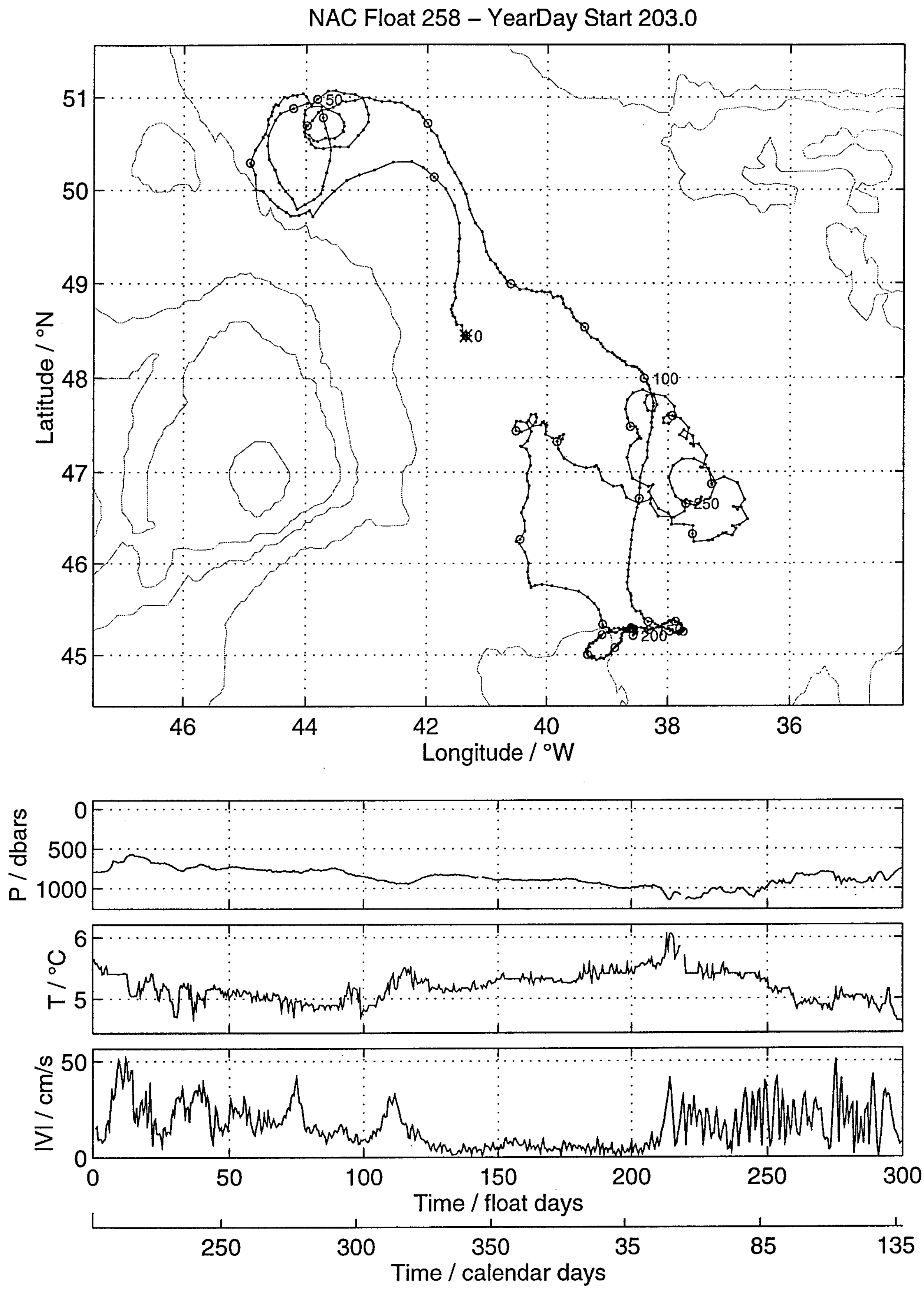

NAC Float 256 – YearDay Start 206.5
Latitude / °N
Longitude / °W
49
48
47
46
45
44
43
42
46
44
42
40
38
36
34
32
0
50
100
150
200
250
P / dbars
500
1000
T / °C
8
6
4
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
250
300
350
35
85
135
Time / calendar days

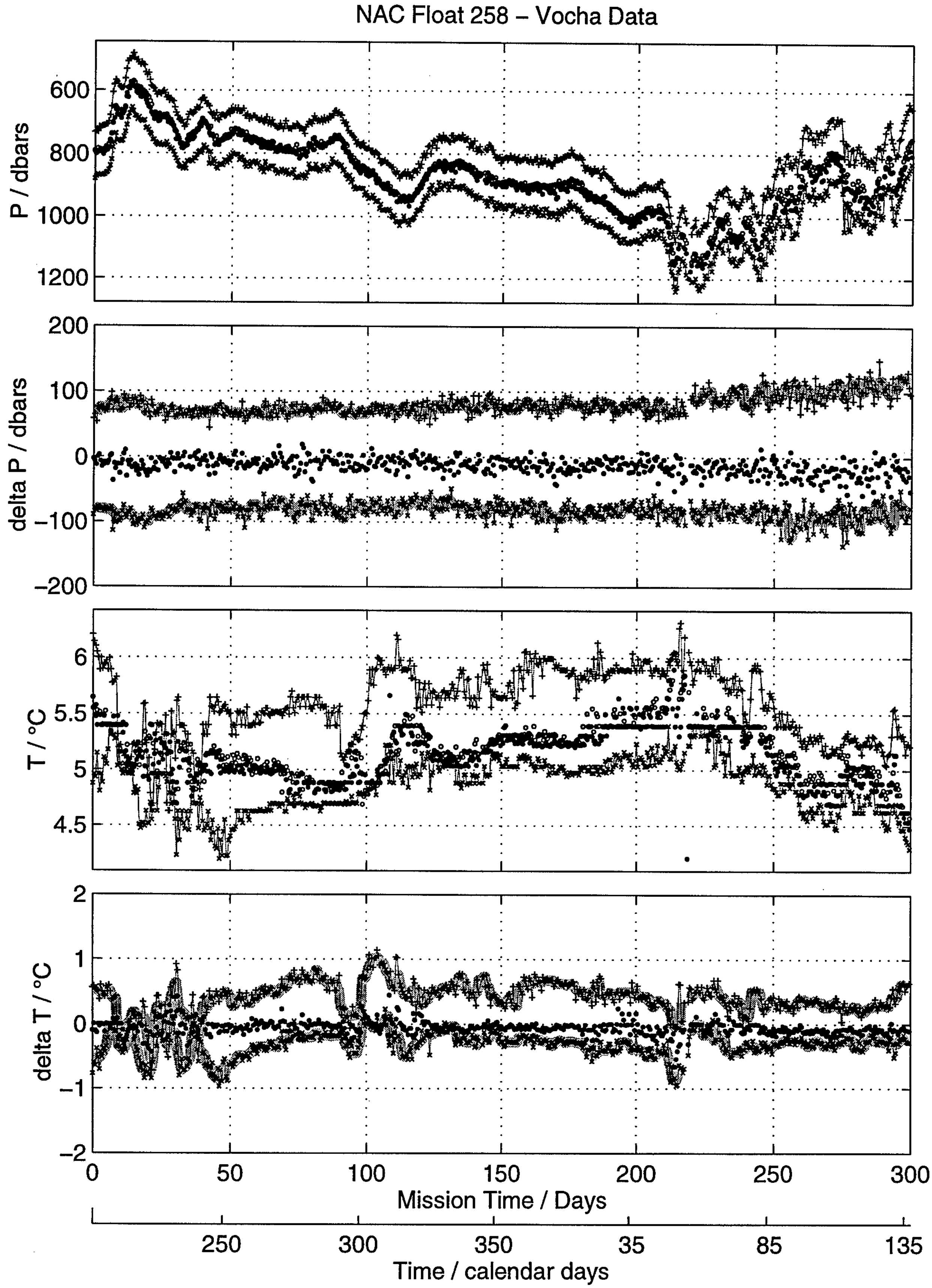

NAC Float 256 – Vocha Data
P / dbars
400
600
800
1000
delta P / dbars
200
100
0
−100
−200
T / °C
8
7
6
5
4
3
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

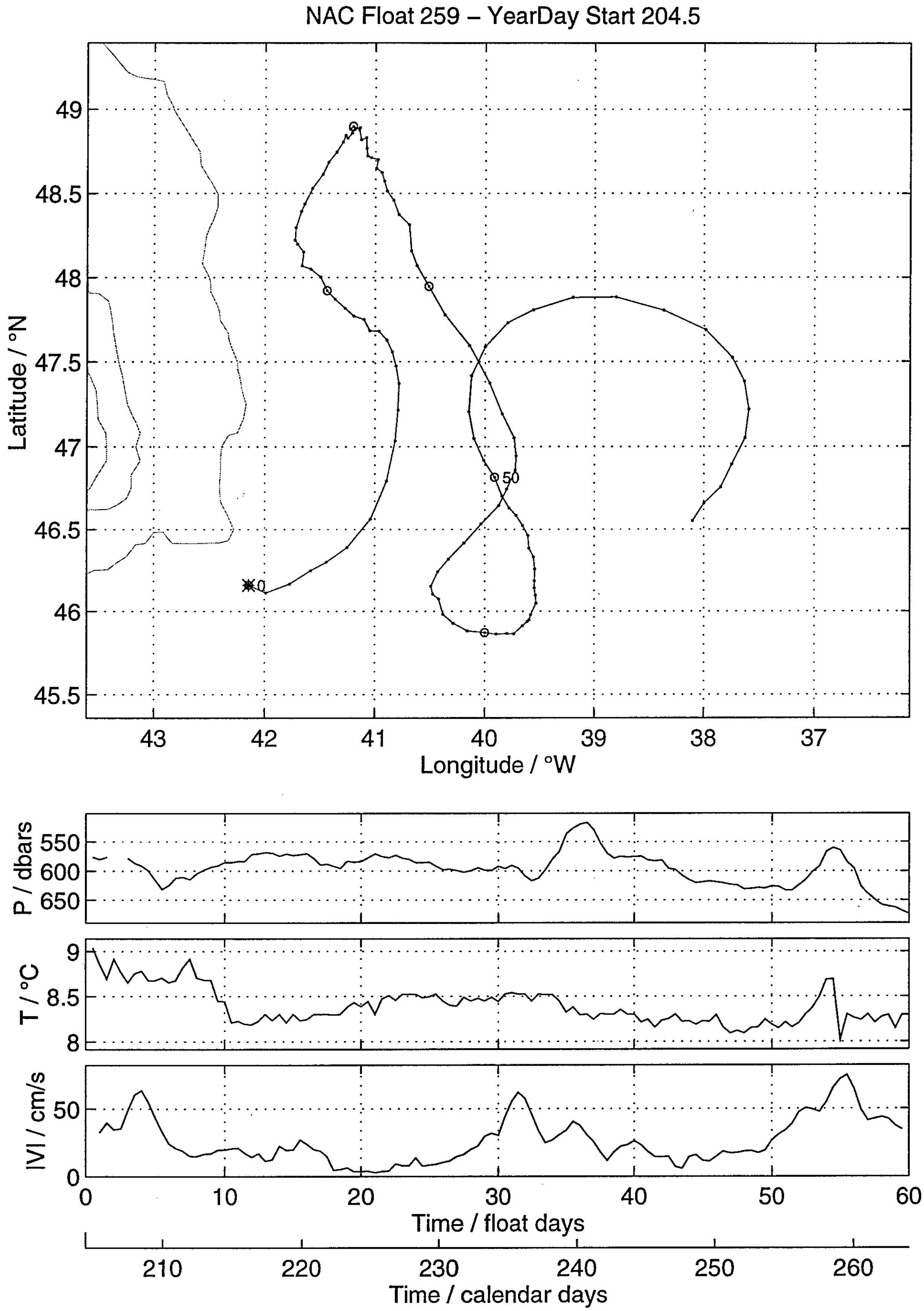


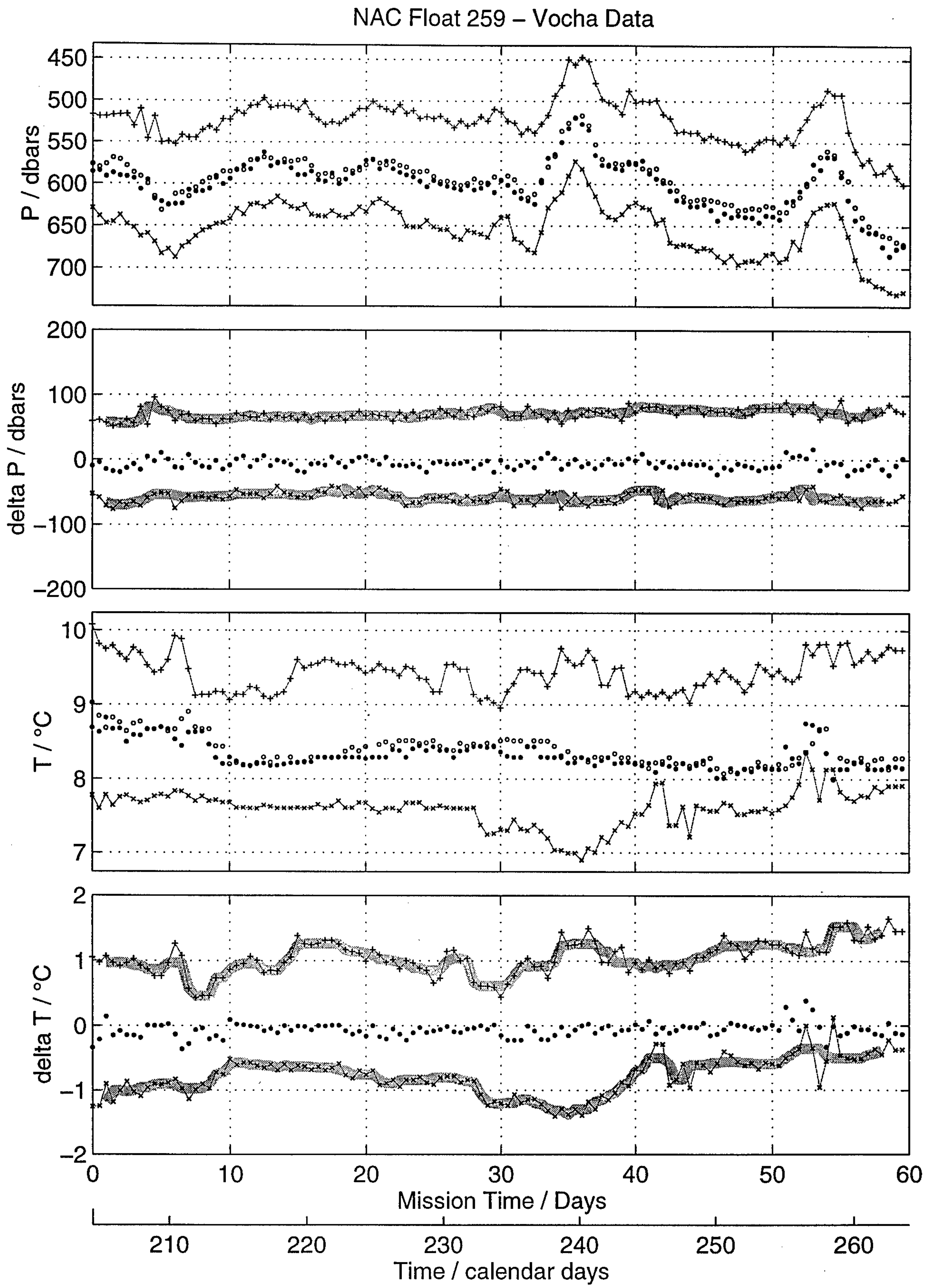
NAC Float 257 – YearDay Start 216.5
Latitude / °N
Longitude / °W
44
43
42
41
40
39
46
44
42
40
38
0
50
100
150
200
250
P / dbars
700
800
900
1000
1100
T / °C
7
6
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
250
300
350
35
85
135
Time / calendar days


NAC Float 257 – Vocha Data
P / dbars
700
800
900
1000
1100
1200
delta P / dbars
200
100
0
−100
−200
T / °C
8
7.5
7
6.5
6
5.5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

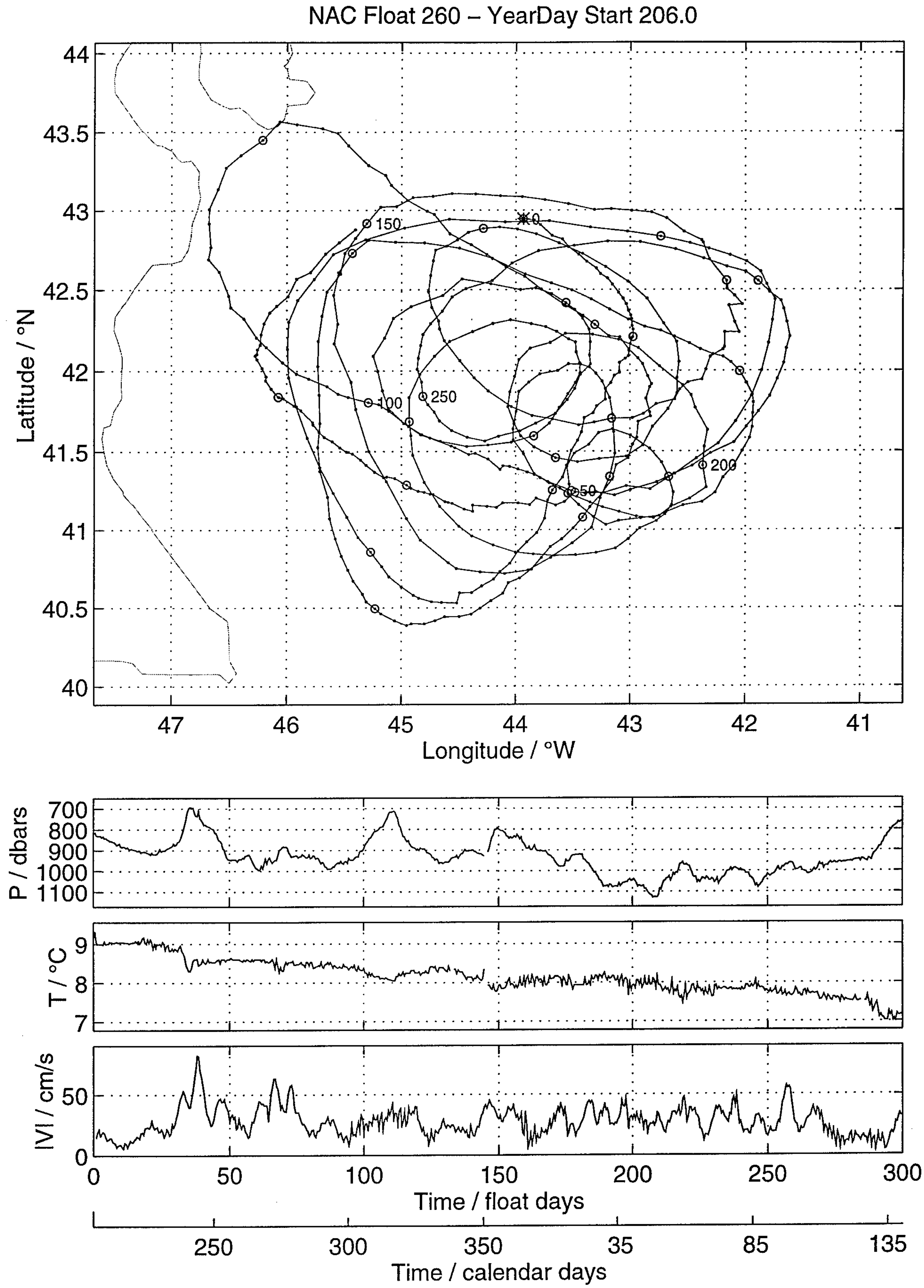

NAC Float 258 – YearDay Start 203.0
Latitude / °N
Longitude / °W
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

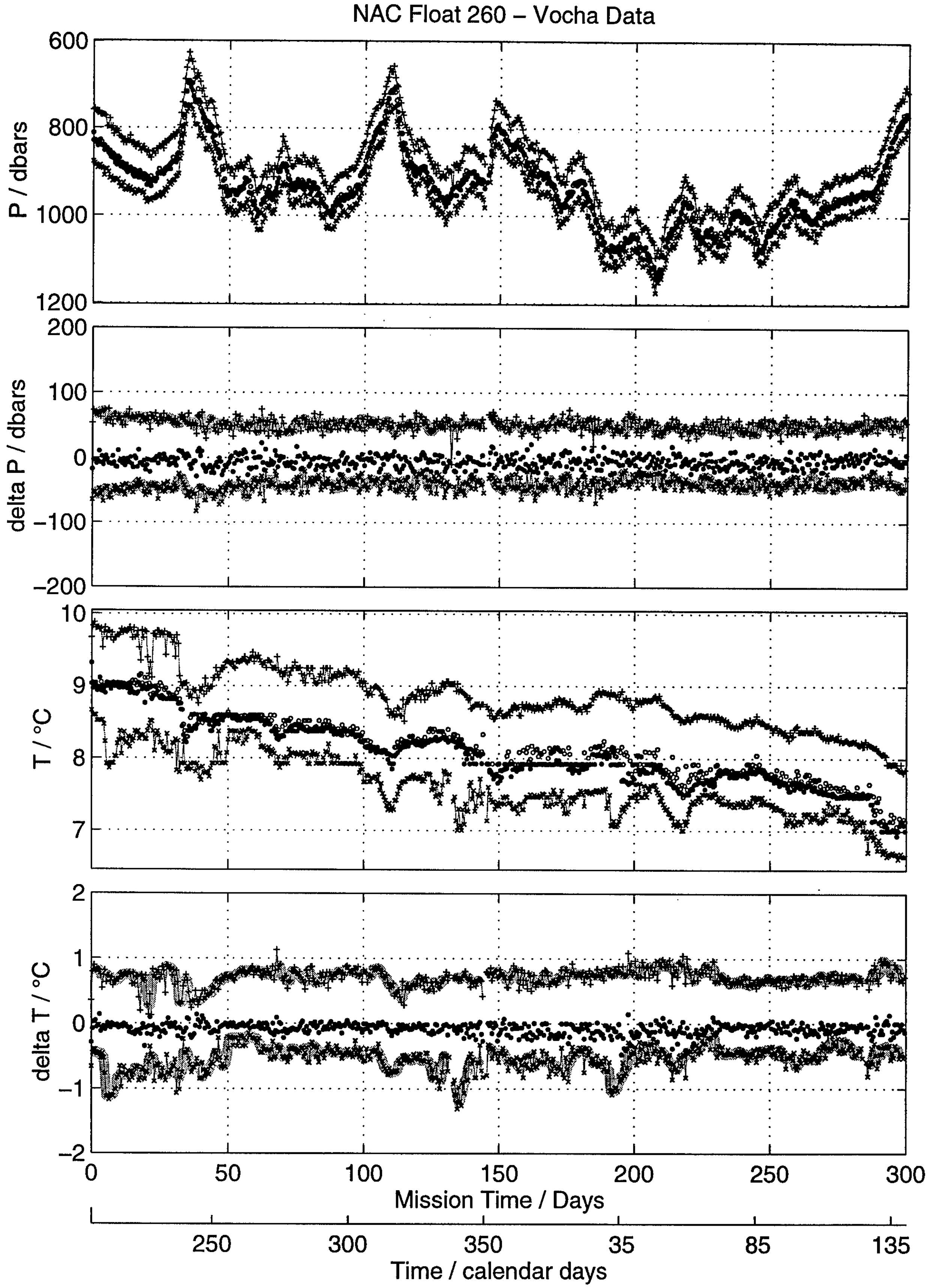

NAC Float 258 – Vocha Data
P / dbars
600
800
1000
1200
delta P / dbars
200
100
0
−100
−200
T / °C
6
5.5
5
4.5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

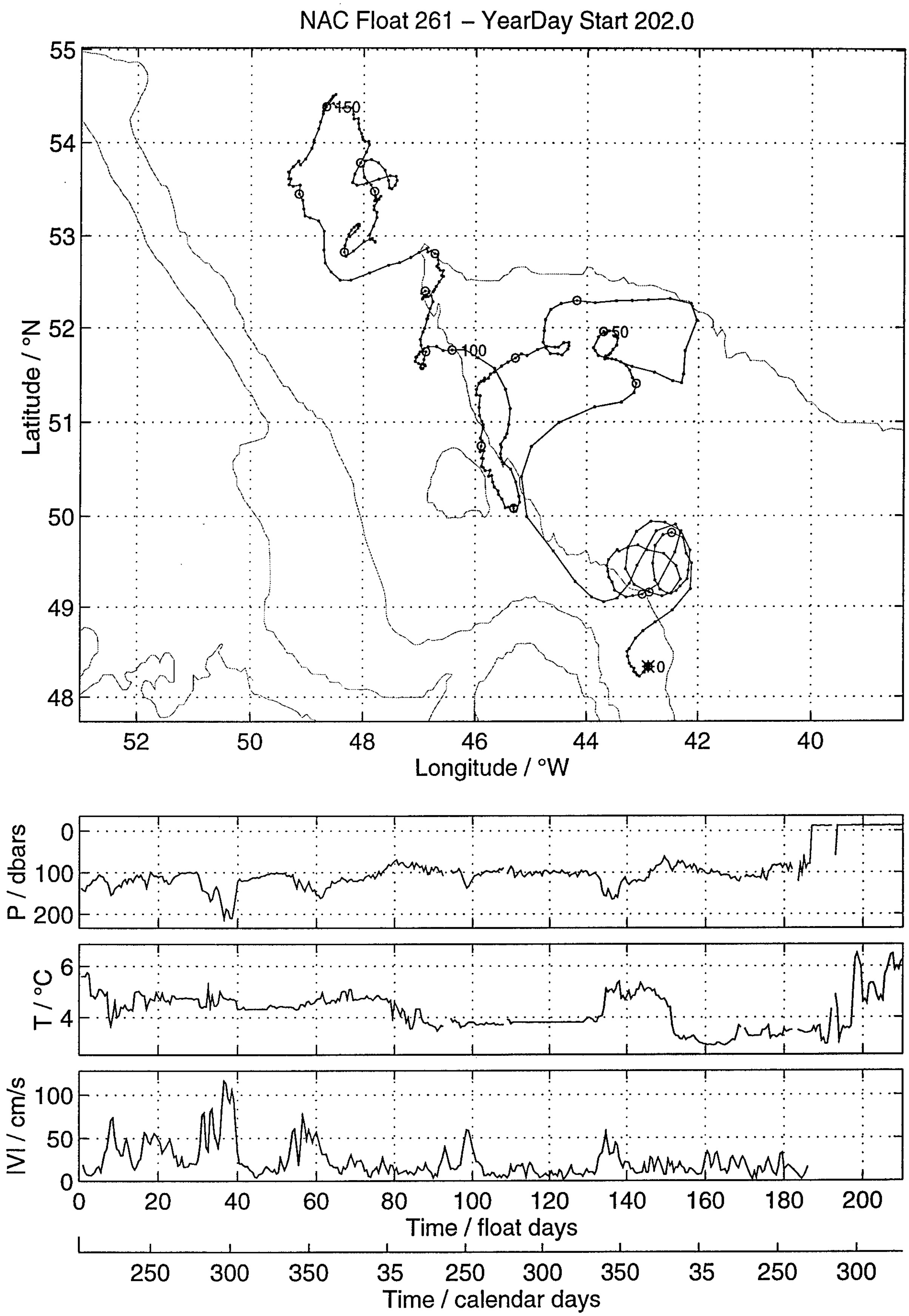

NAC Float 259 – YearDay Start 204.5
Latitude / °N
Longitude / °W
49
48.5
48
47.5
47
46.5
46
45.5
43
42
41
40
39
38
37
0
50
P / dbars
550
600
650
T / °C
9
8.5
8
|V| / cm/s
50
0
10
20
30
40
60
Time / float days
210
220
230
240
250
260
Time / calendar days



NAC Float 259 – Vocha Data
P / dbars
450
500
550
600
650
700
delta P / dbars
200
100
0
−100
−200
T / °C
10
9
8
7
delta T / °C
2
1
0
−1
−2
0
10
20
30
40
50
60
Mission Time / Days
210
220
230
240
250
260
Time / calendar days

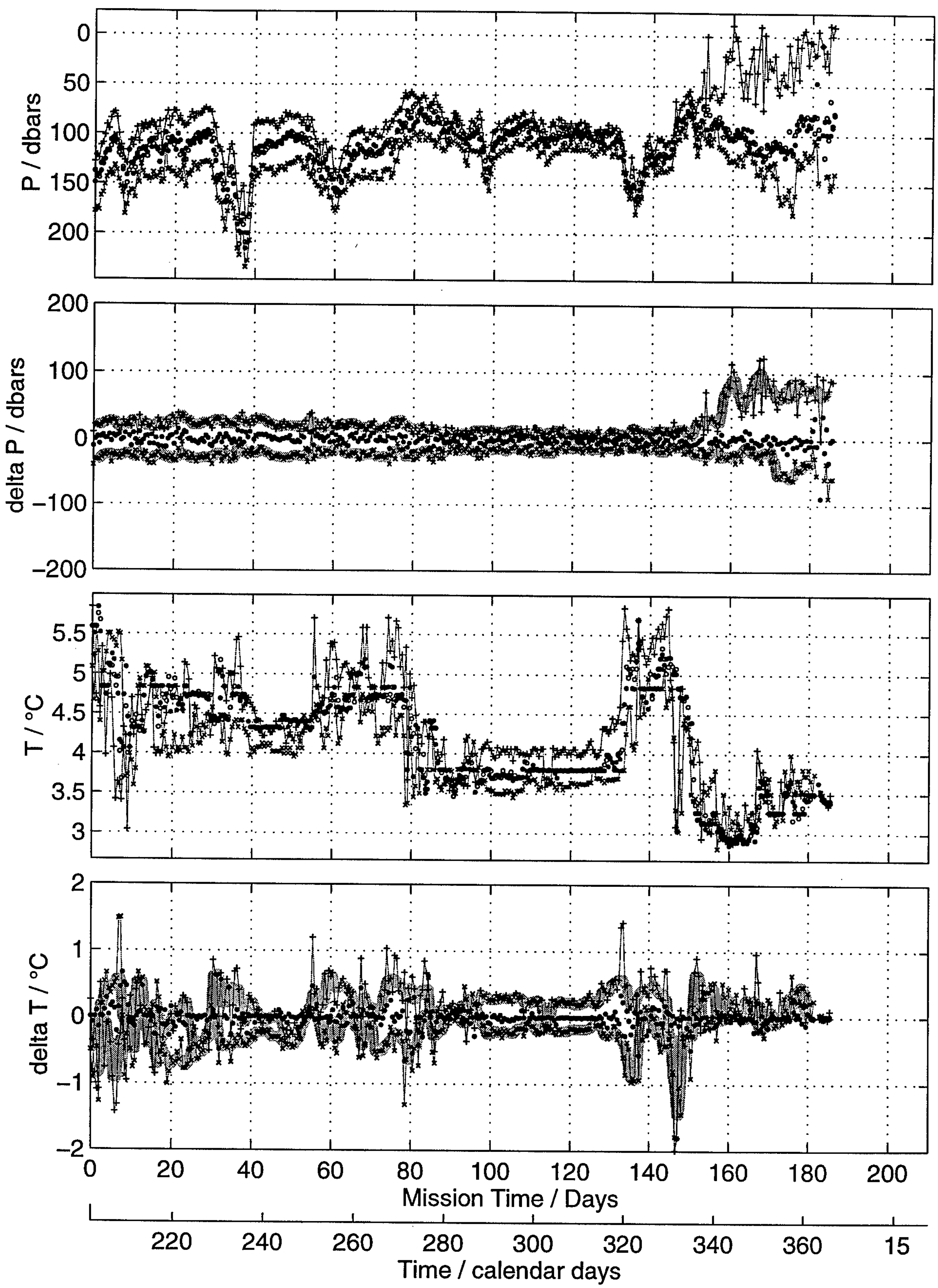

NAC Float 260 – YearDay Start 206.0
Latitude / °N
Longitude / °W
0
50
100
150
200
250
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days
250
300
350
35
85
135

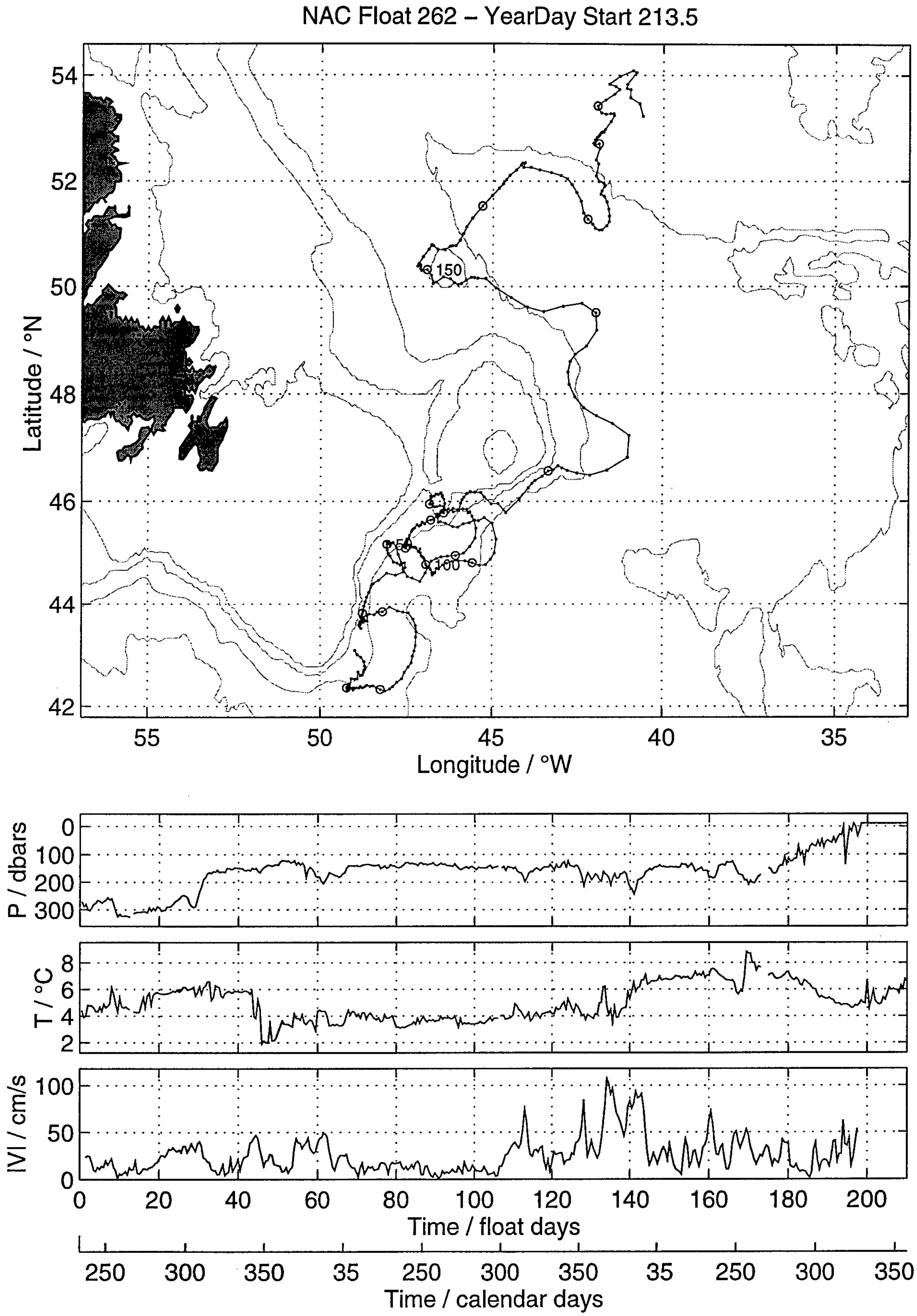

NAC Float 260 – Vocha Data
600
800
1000
1200
P / dbars
200
100
0
−100
−200
delta P / dbars
10
9
8
7
T / °C
2
1
0
−1
−2
delta T / °C
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days



NAC Float 261 – YearDay Start 202.0
Latitude / °N
Longitude / °W
150
100
50
0
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

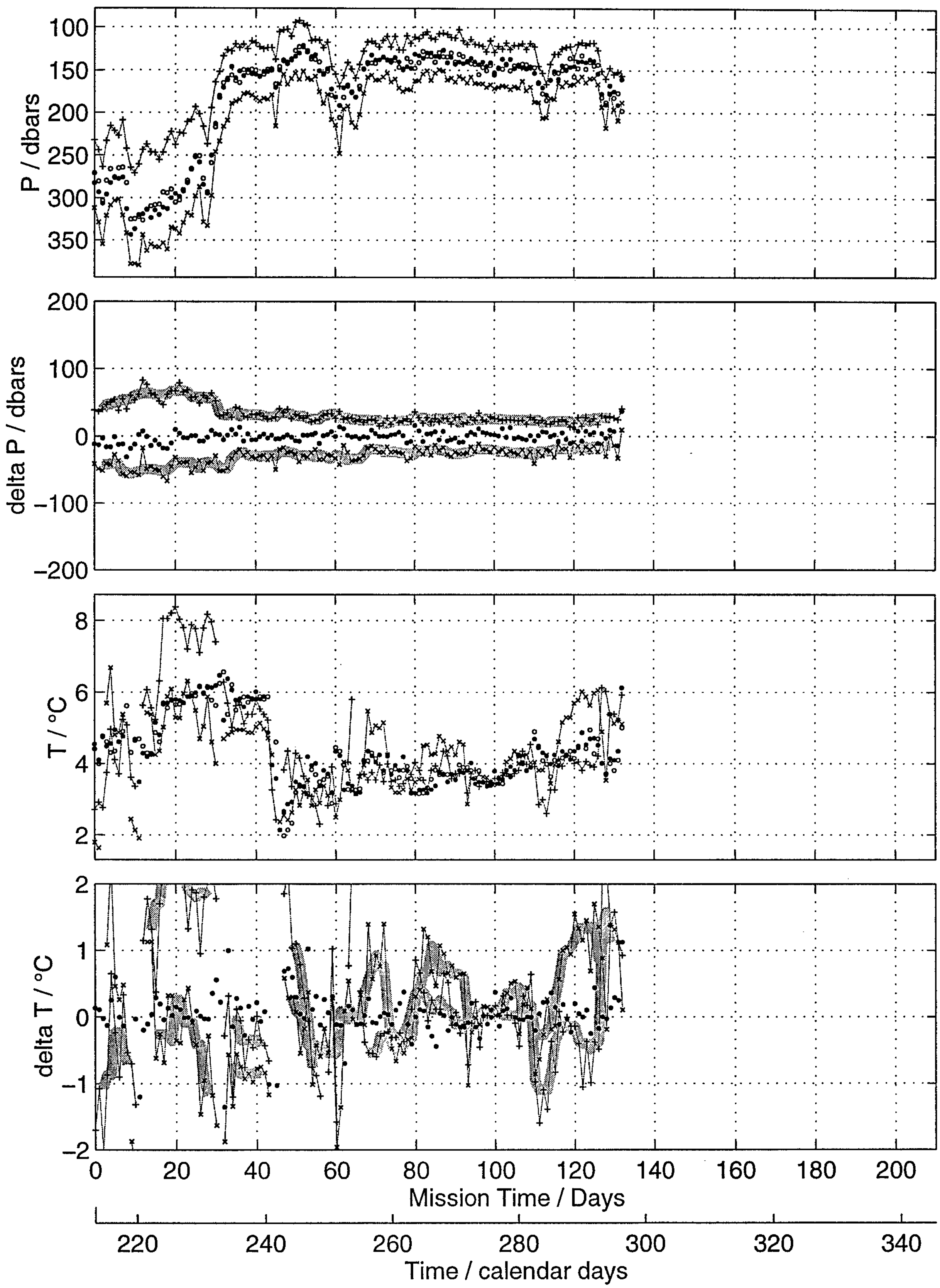
NAC Float 261 – Vocha Data

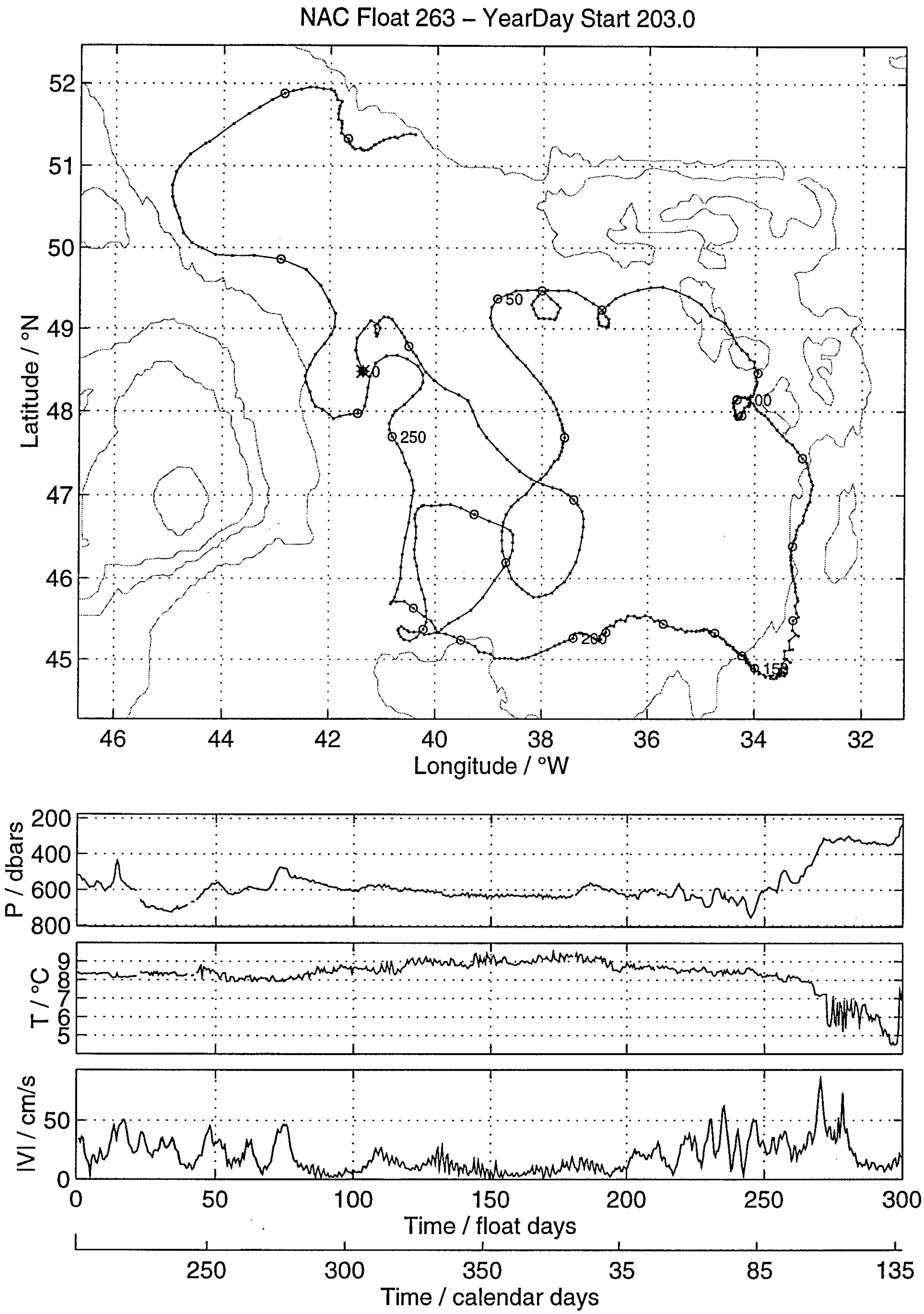


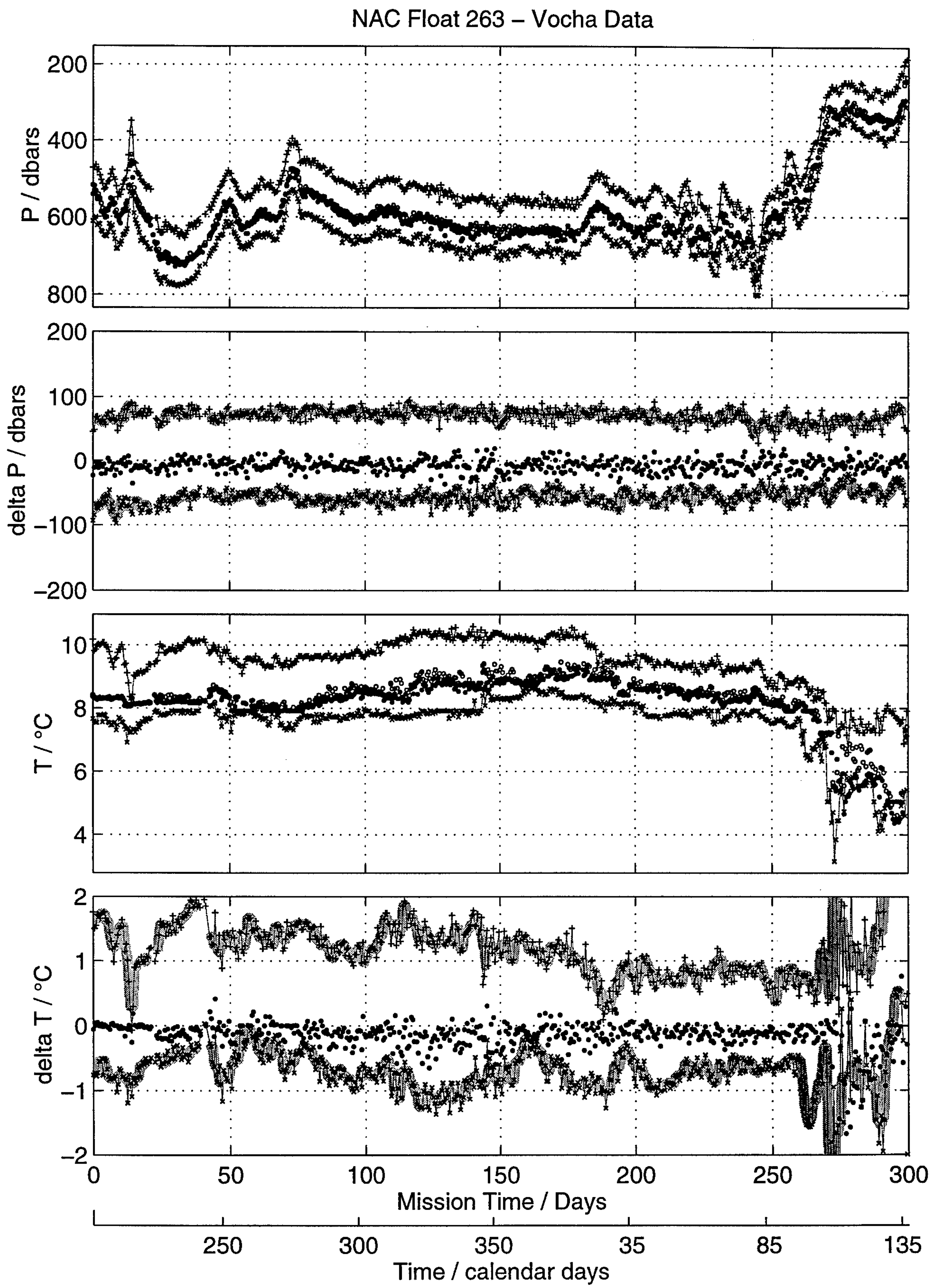


NAC Float 262 – YearDay Start 213.5
Latitude / °N
Longitude / °W
150
50
100
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

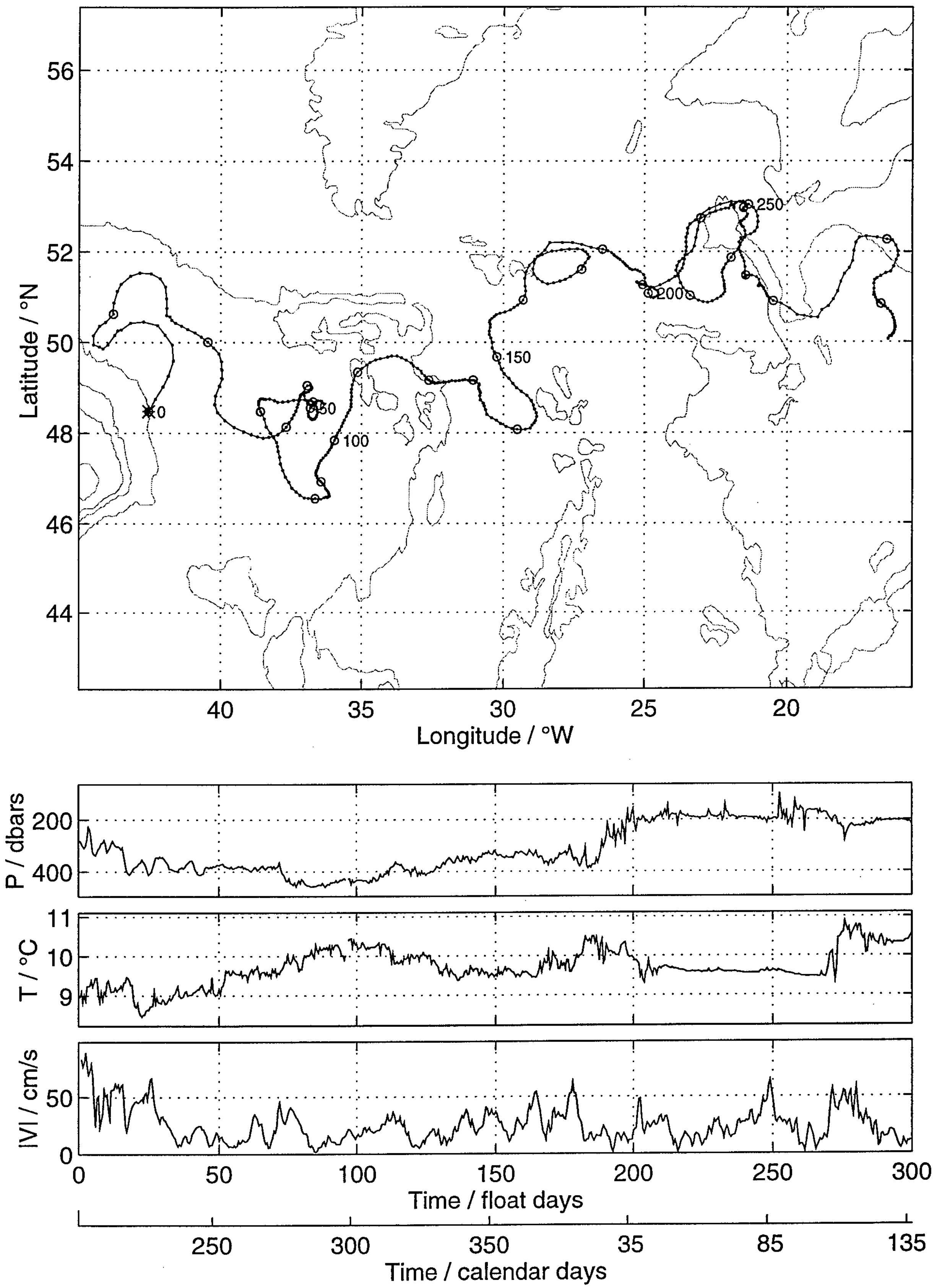
NAC Float 262 – Vocha Data

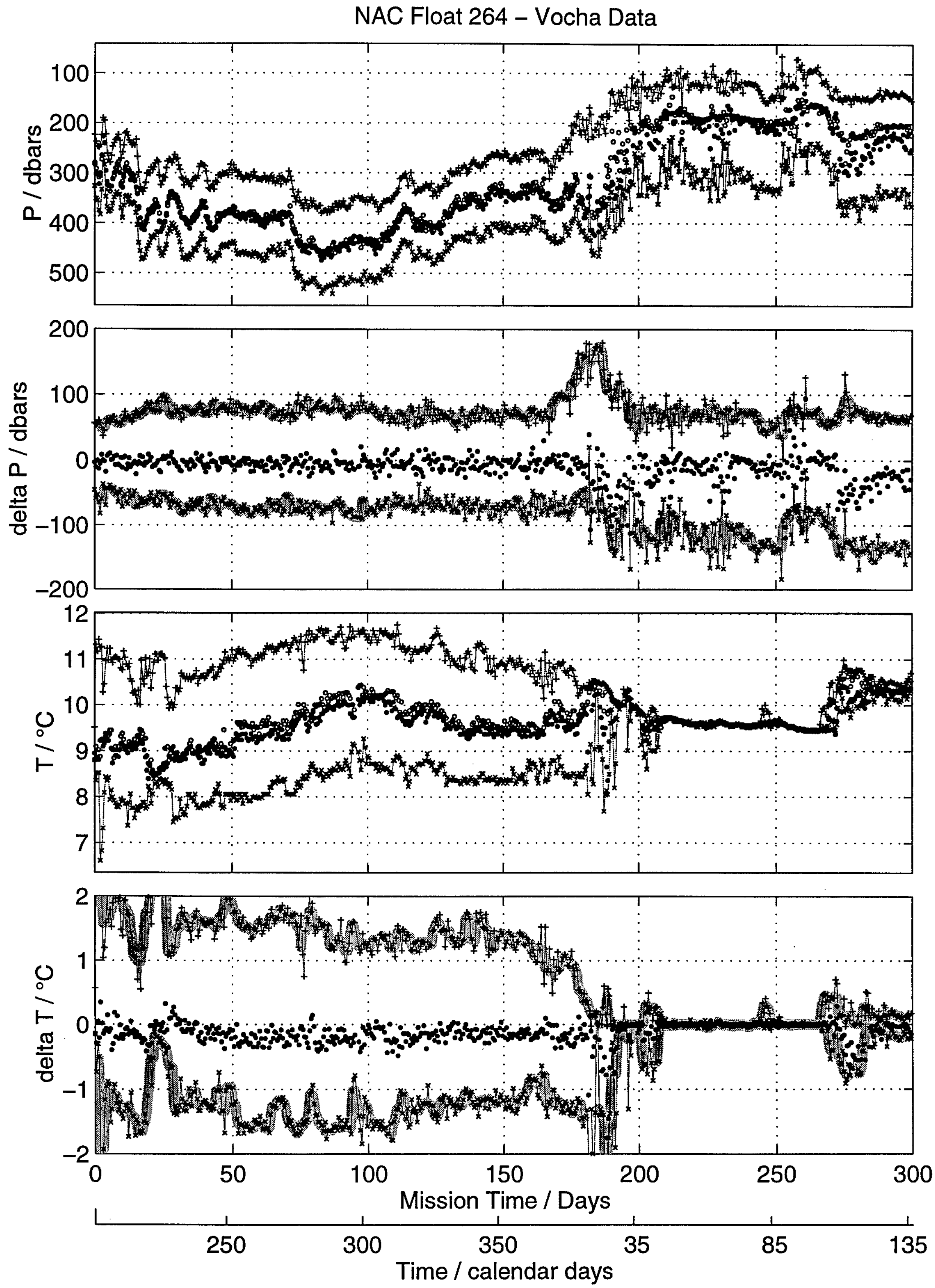



NAC Float 263 – YearDay Start 203.0
Latitude / °N
Longitude / °W
52
51
50
49
48
47
46
45
46
44
42
40
38
36
34
32
0
50
100
150
200
250
P / dbars
200
400
600
800
T / °C
9
8
7
6
5
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
250
300
350
35
85
135
Time / calendar days

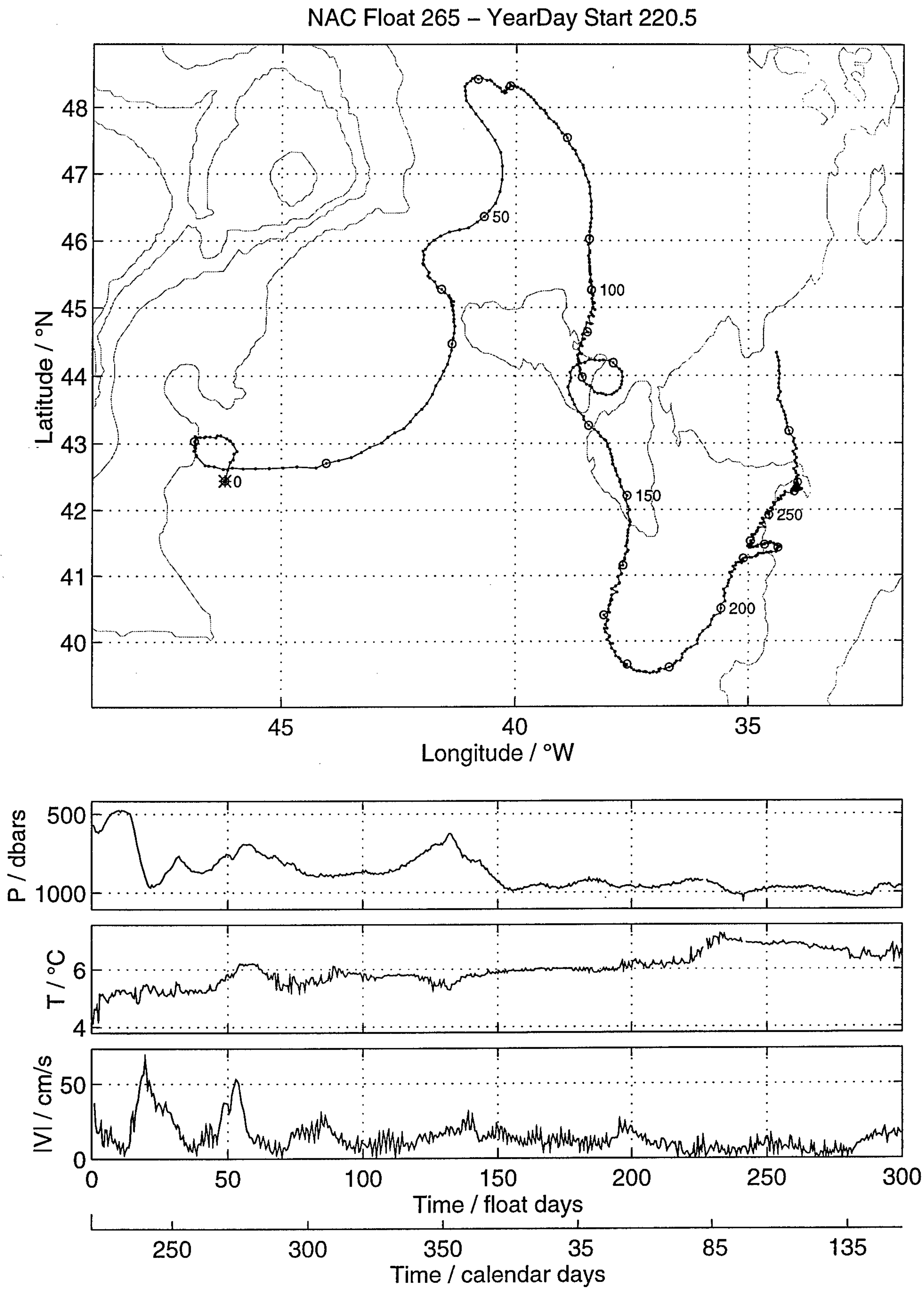

NAC Float 263 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days

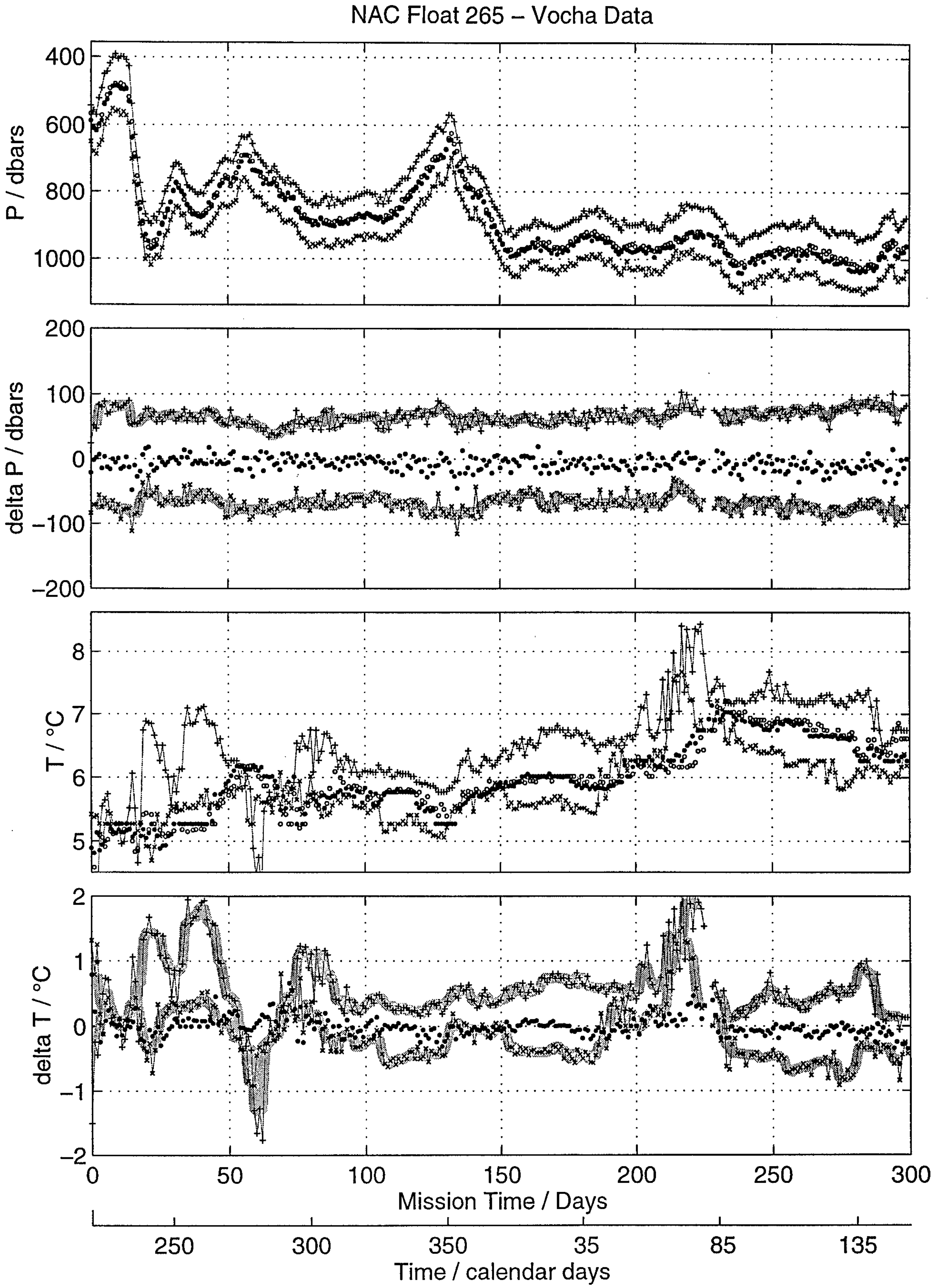
NAC Float 264 – YearDay Start 202.5





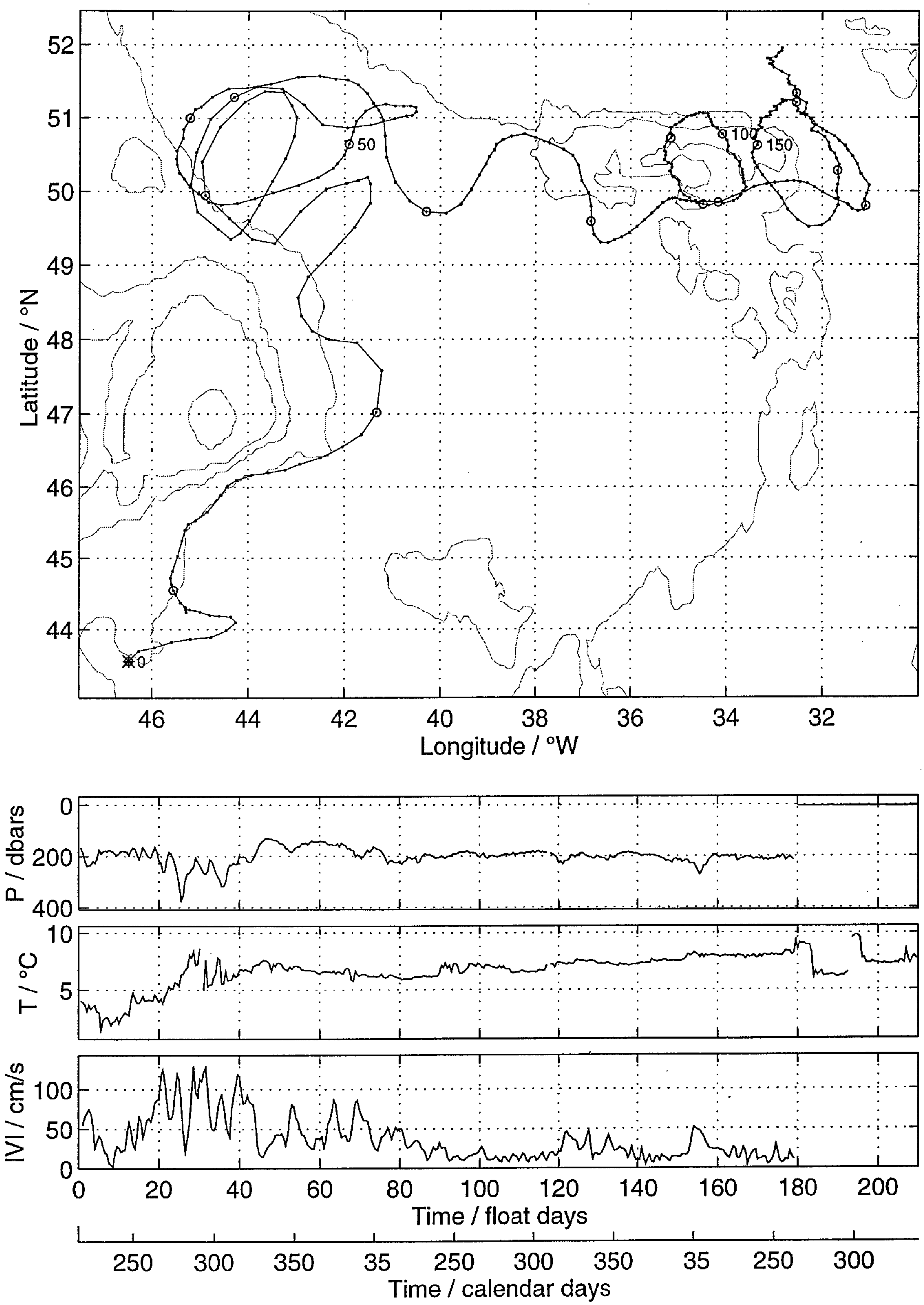
NAC Float 264 – Vocha Data
P / dbars
100
200
300
400
500
delta P / dbars
200
100
0
−100
−200
T / °C
12
11
10
9
8
7
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

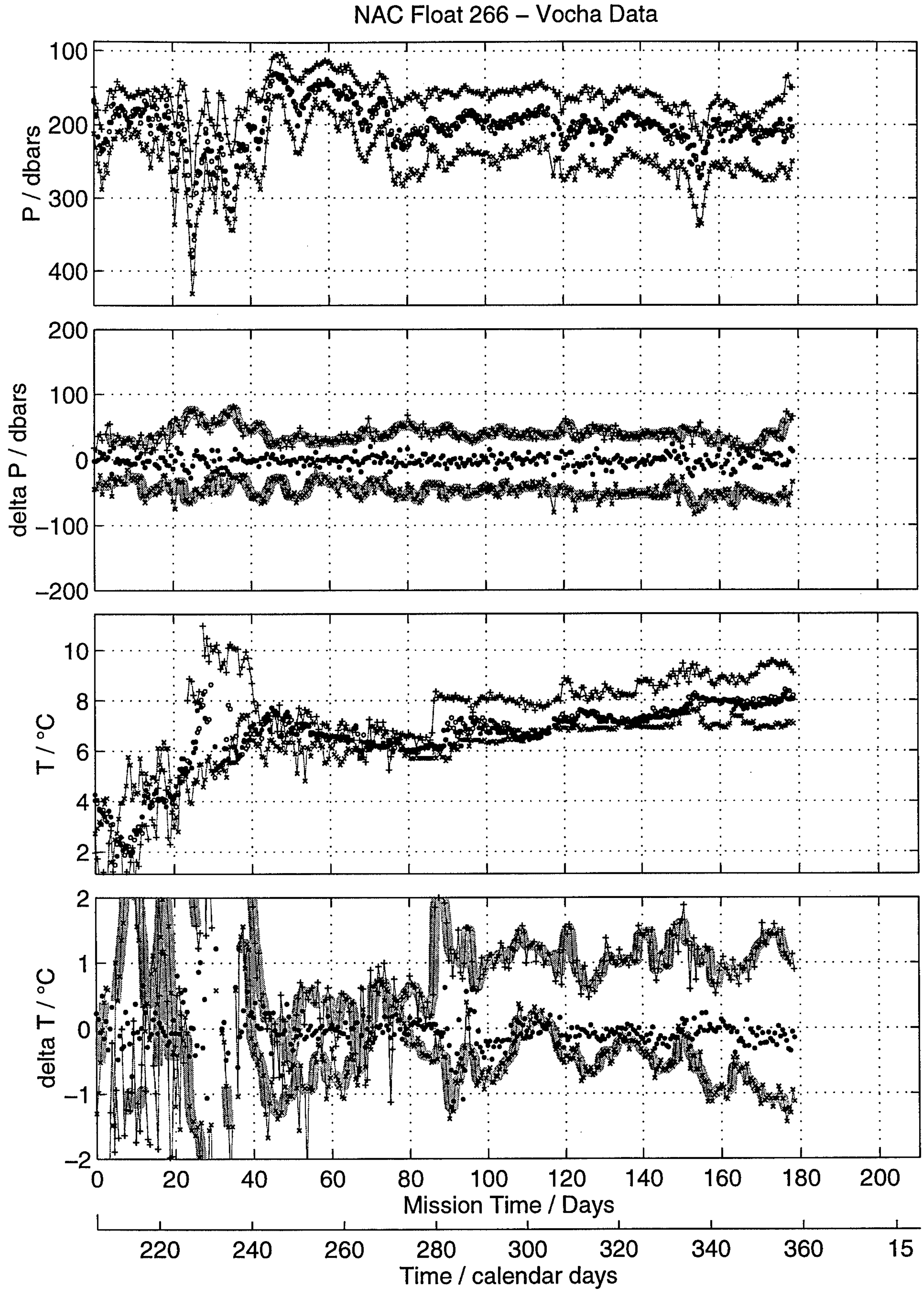

NAC Float 265 – YearDay Start 220.5
Latitude / °N
48
47
46
45
44
43
42
41
40
45
40
35
Longitude / °W
0
50
100
150
200
250
P / dbars
500
1000
T / °C
6
4
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
250
300
350
35
85
135
Time / calendar days



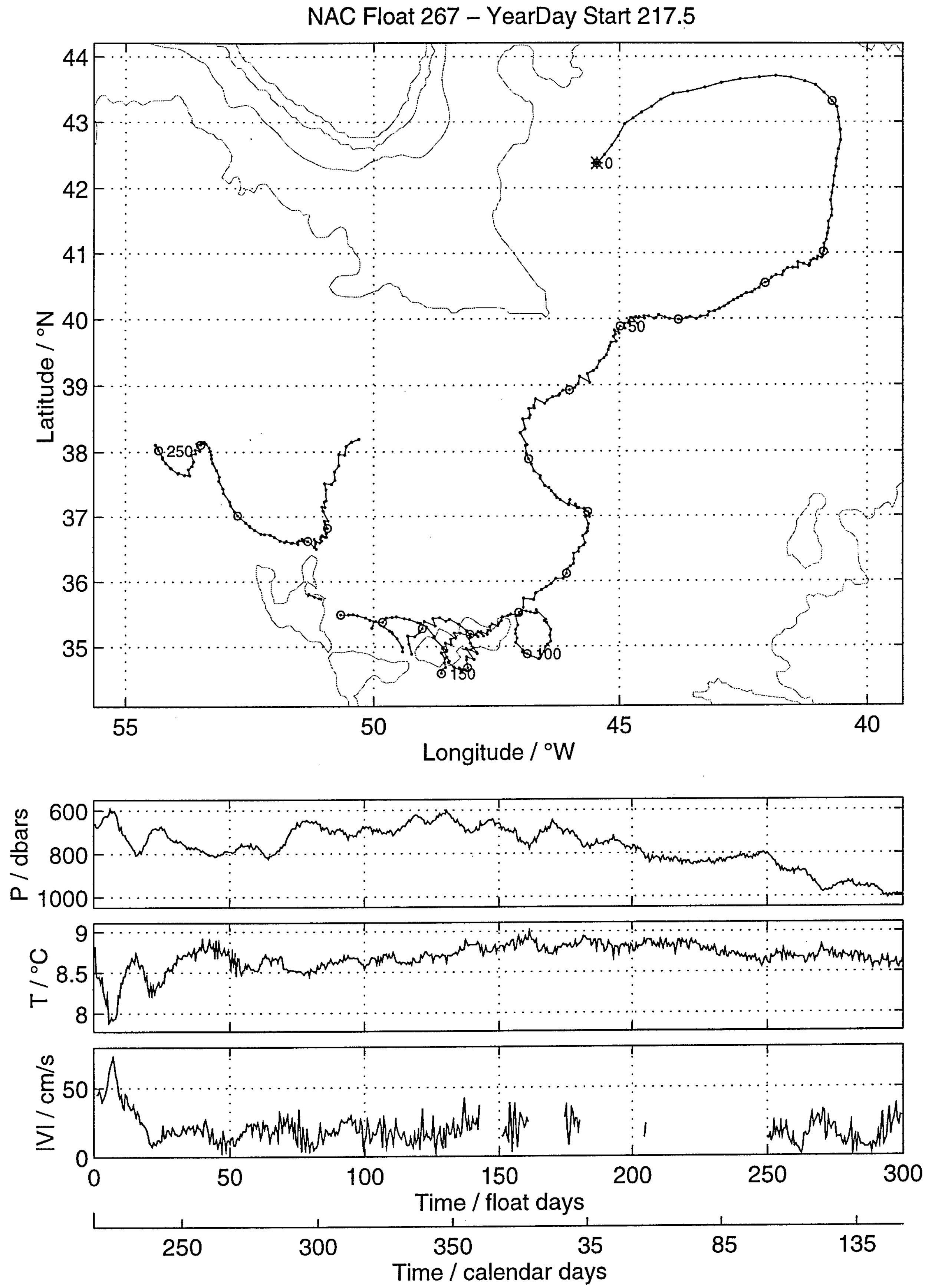
NAC Float 265 – Vocha Data
P / dbars
400
600
800
1000
delta P / dbars
200
100
0
−100
−200
T / °C
8
7
6
5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

NAC Float 266 – YearDay Start 206.5

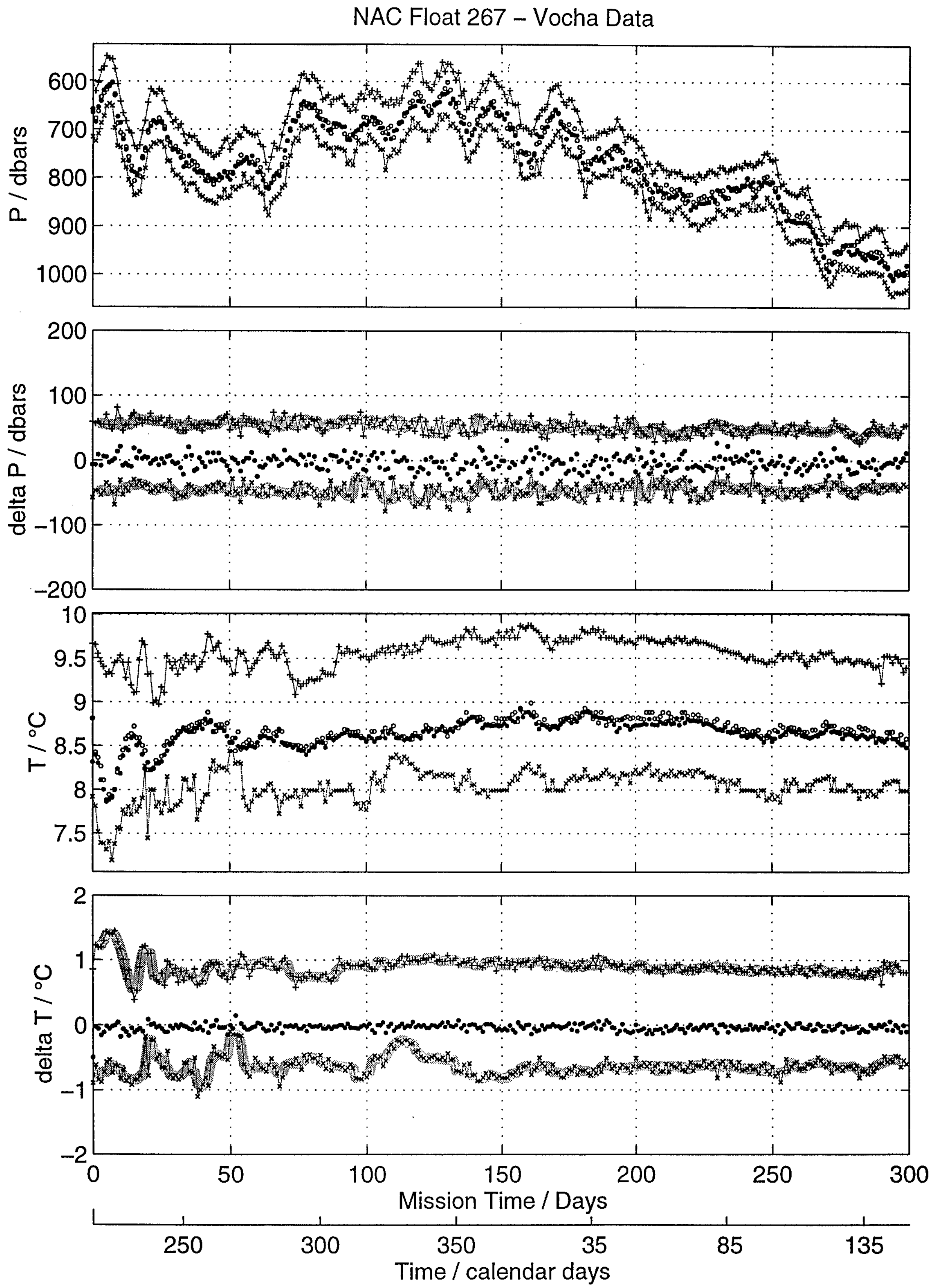




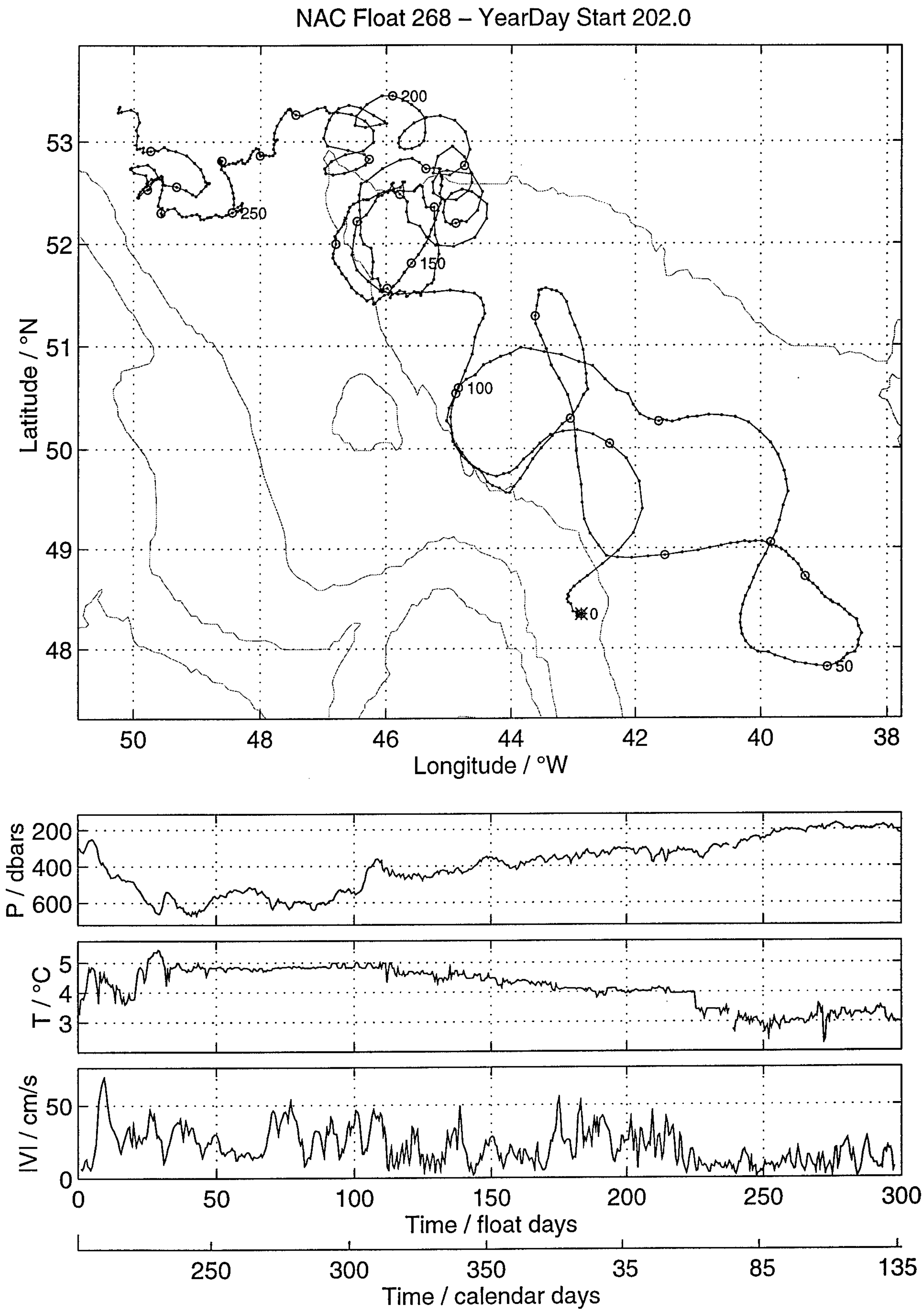
NAC Float 266 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days



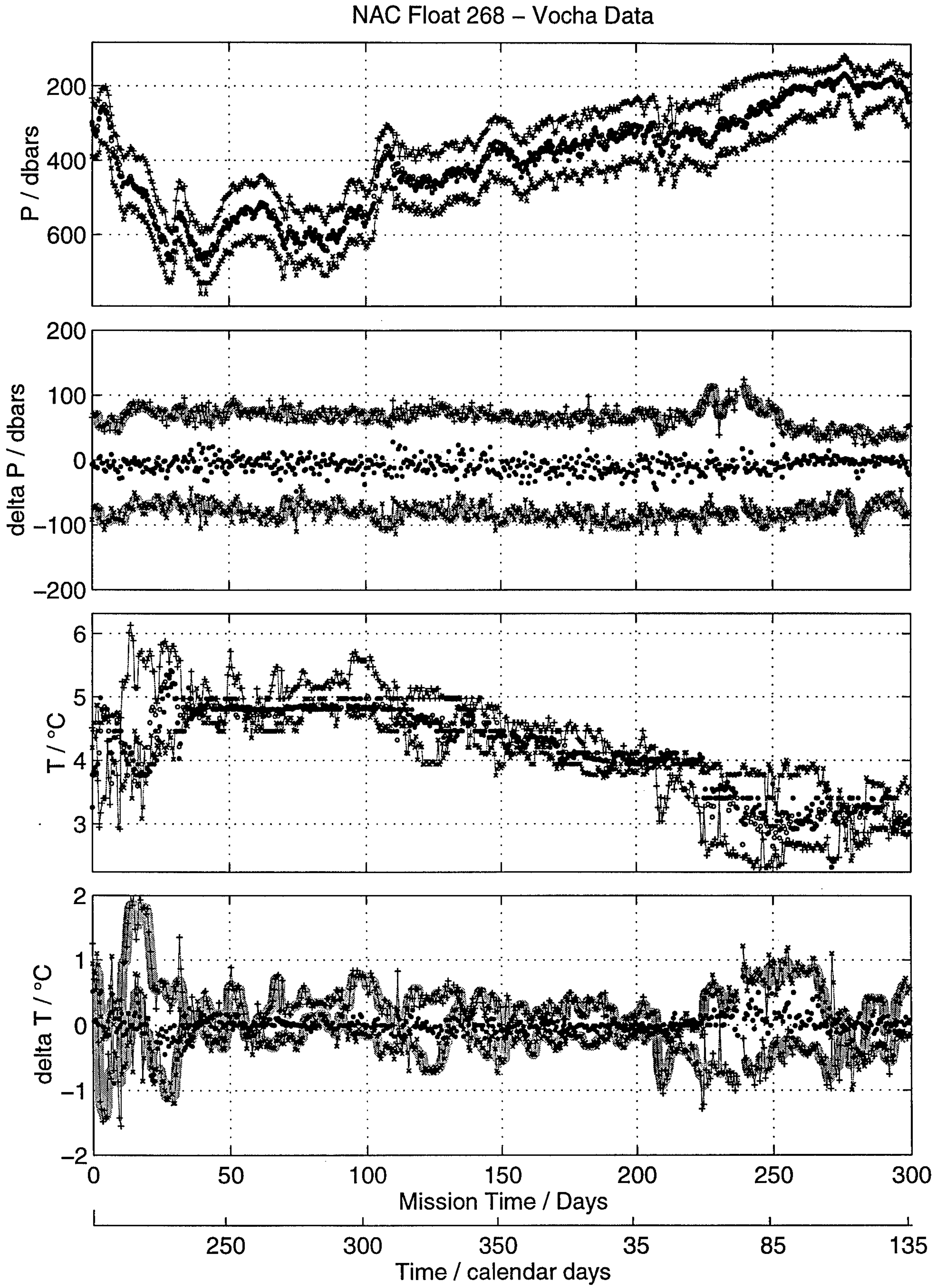
NAC Float 267 – YearDay Start 217.5
Latitude / °N
Longitude / °W
44
43
42
41
40
39
38
37
36
35
55
50
45
40
0
50
100
150
250
P / dbars
600
800
1000
T / °C
9
8.5
8
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
250
300
350
35
85
135
Time / calendar days



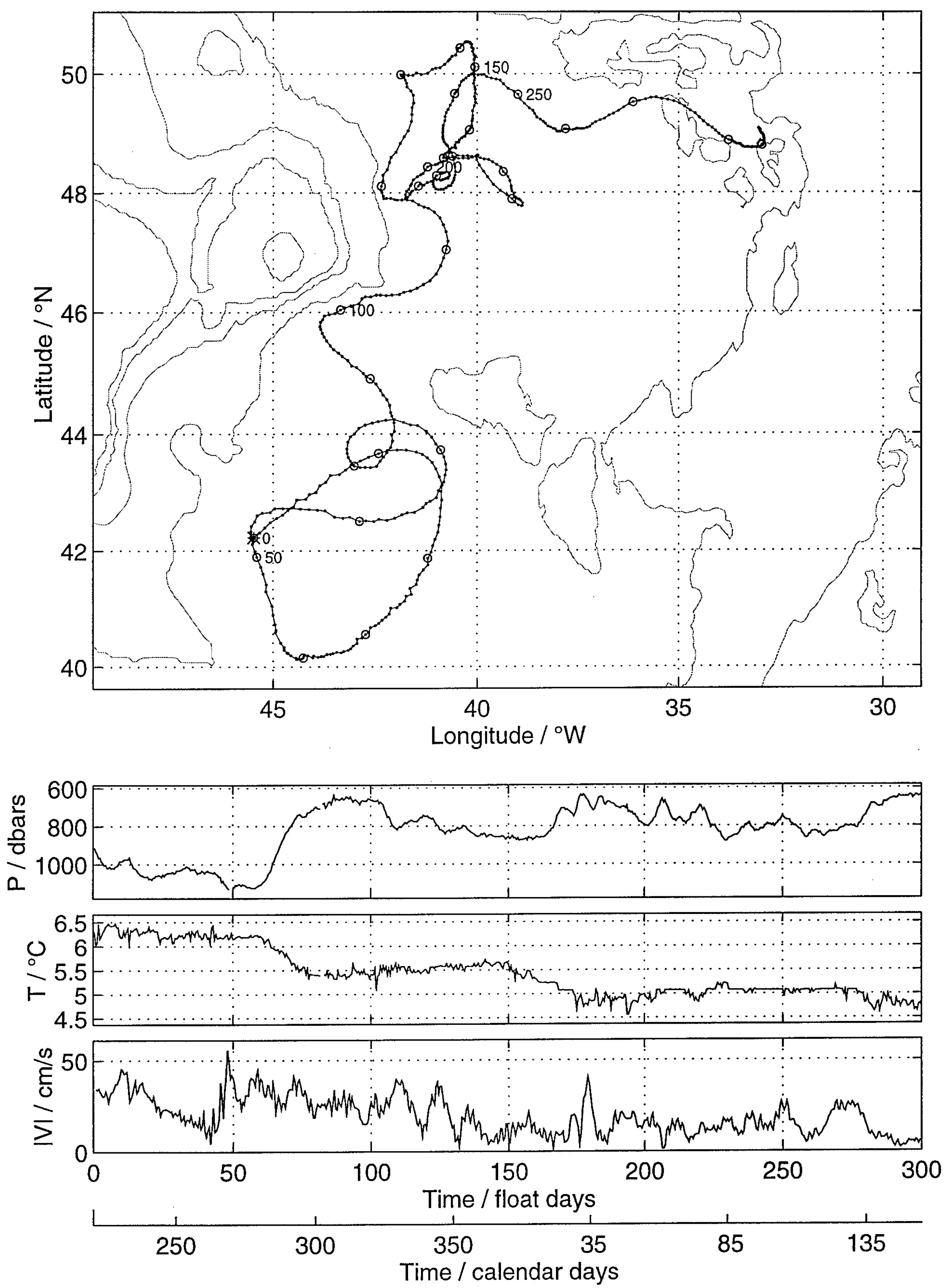
NAC Float 267 – Vocha Data
P / dbars
600
700
800
900
1000
delta P / dbars
200
100
0
−100
−200
T / °C
10
9.5
9
8.5
8
7.5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

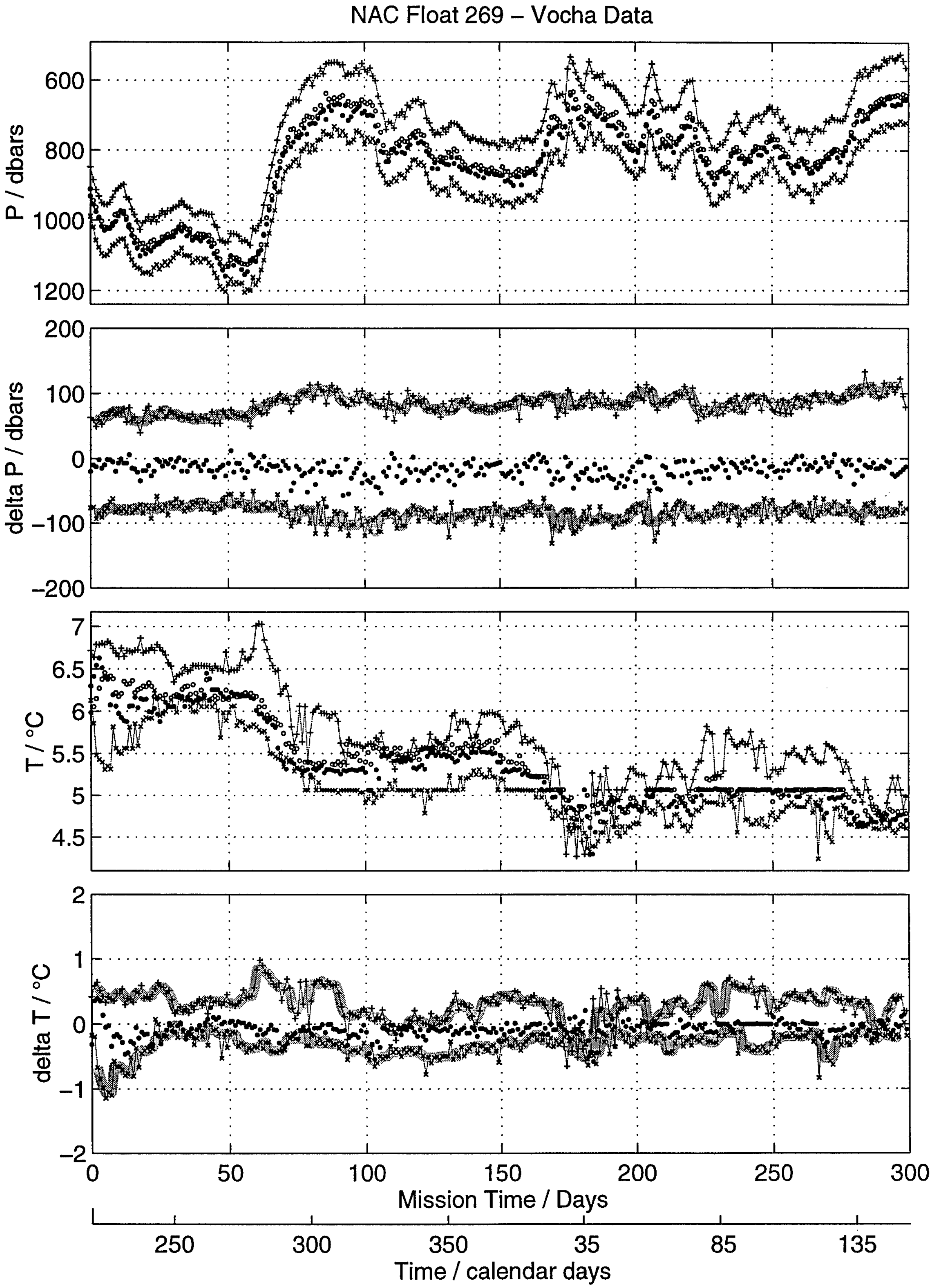


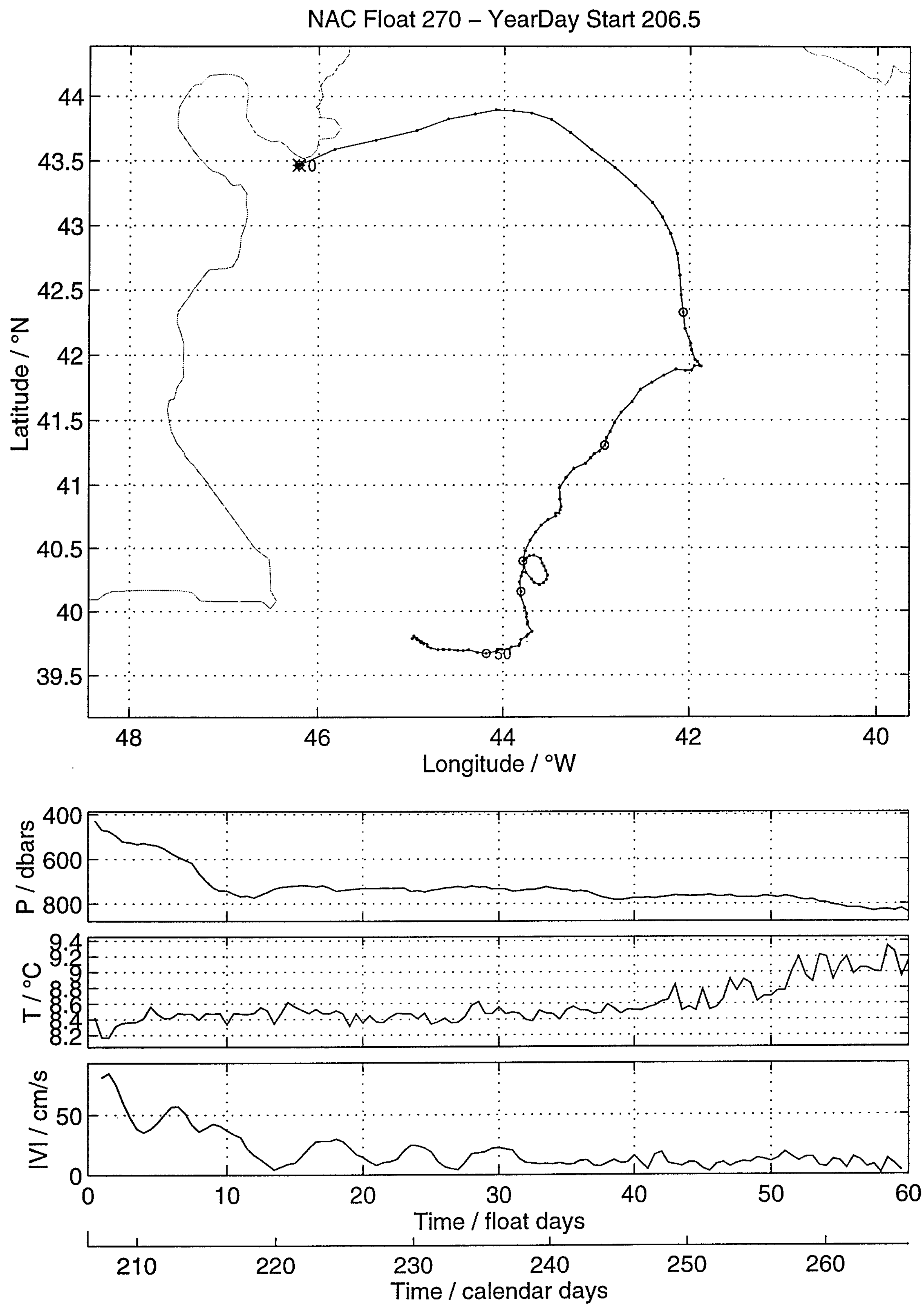
NAC Float 268 – YearDay Start 202.0
Latitude / °N
Longitude / °W
53
52
51
50
49
48
50
48
46
44
42
40
38
200
250
150
100
0
50
P / dbars
200
400
600
T / °C
5
4
3
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
250
300
350
35
85
135
Time / calendar days


NAC Float 268 – Vocha Data
P / dbars
200
400
600
delta P / dbars
200
100
0
−100
−200
T / °C
6
5
4
3
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

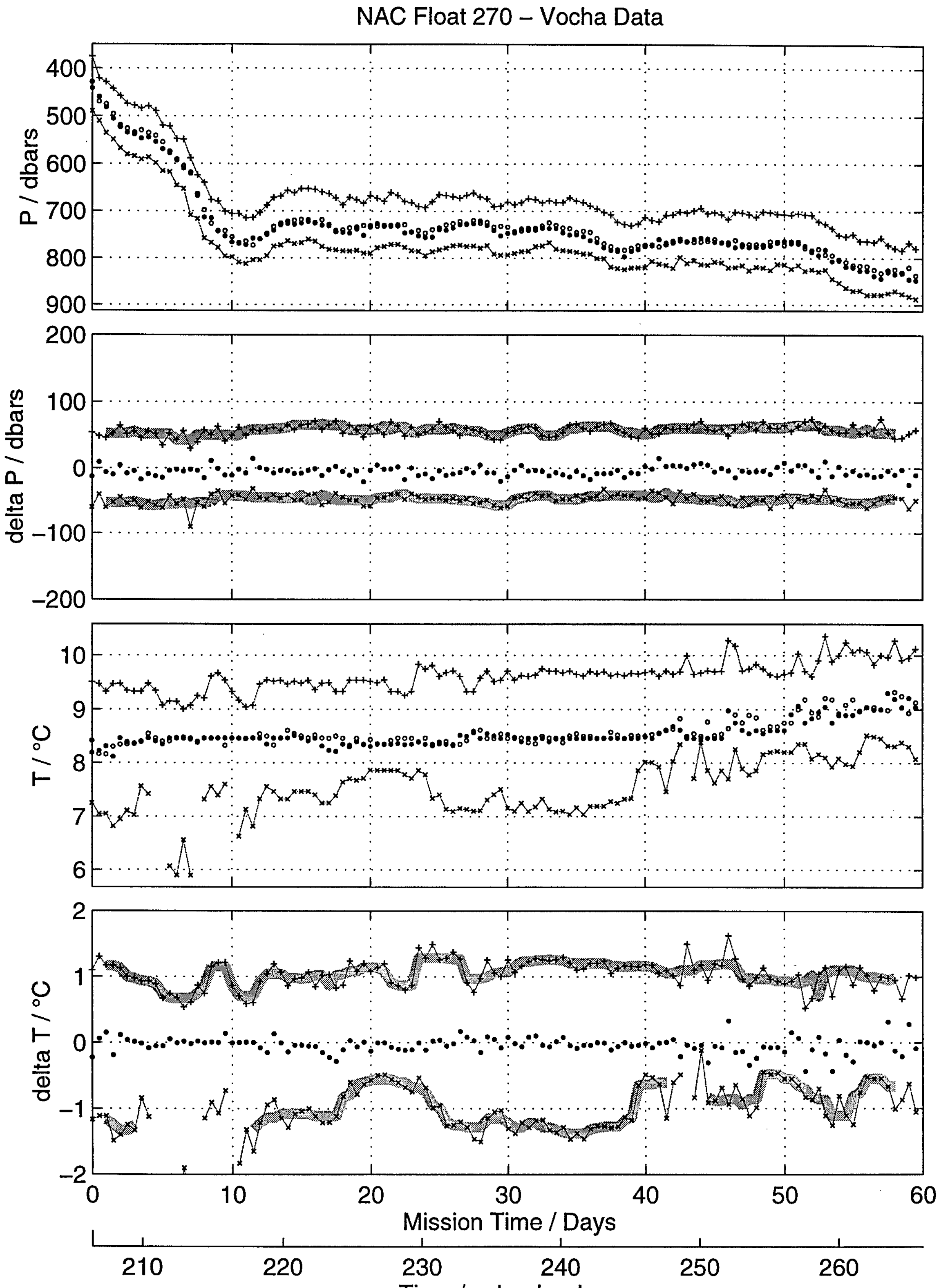
NAC Float 269 – YearDay Start 220.5

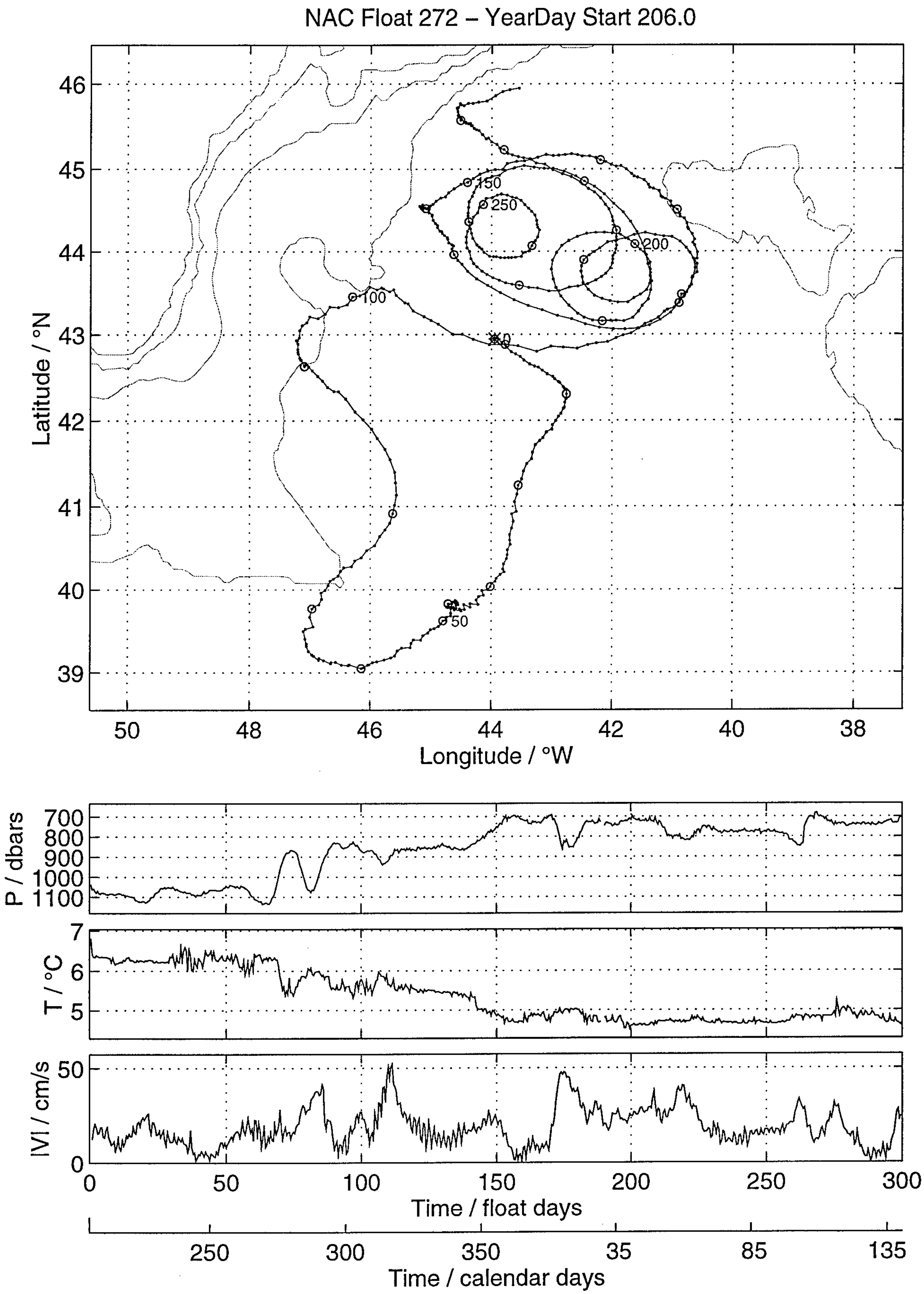



NAC Float 269 – Vocha Data
P / dbars
600
800
1000
1200
delta P / dbars
200
100
0
−100
−200
T / °C
7
6.5
6
5.5
5
4.5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

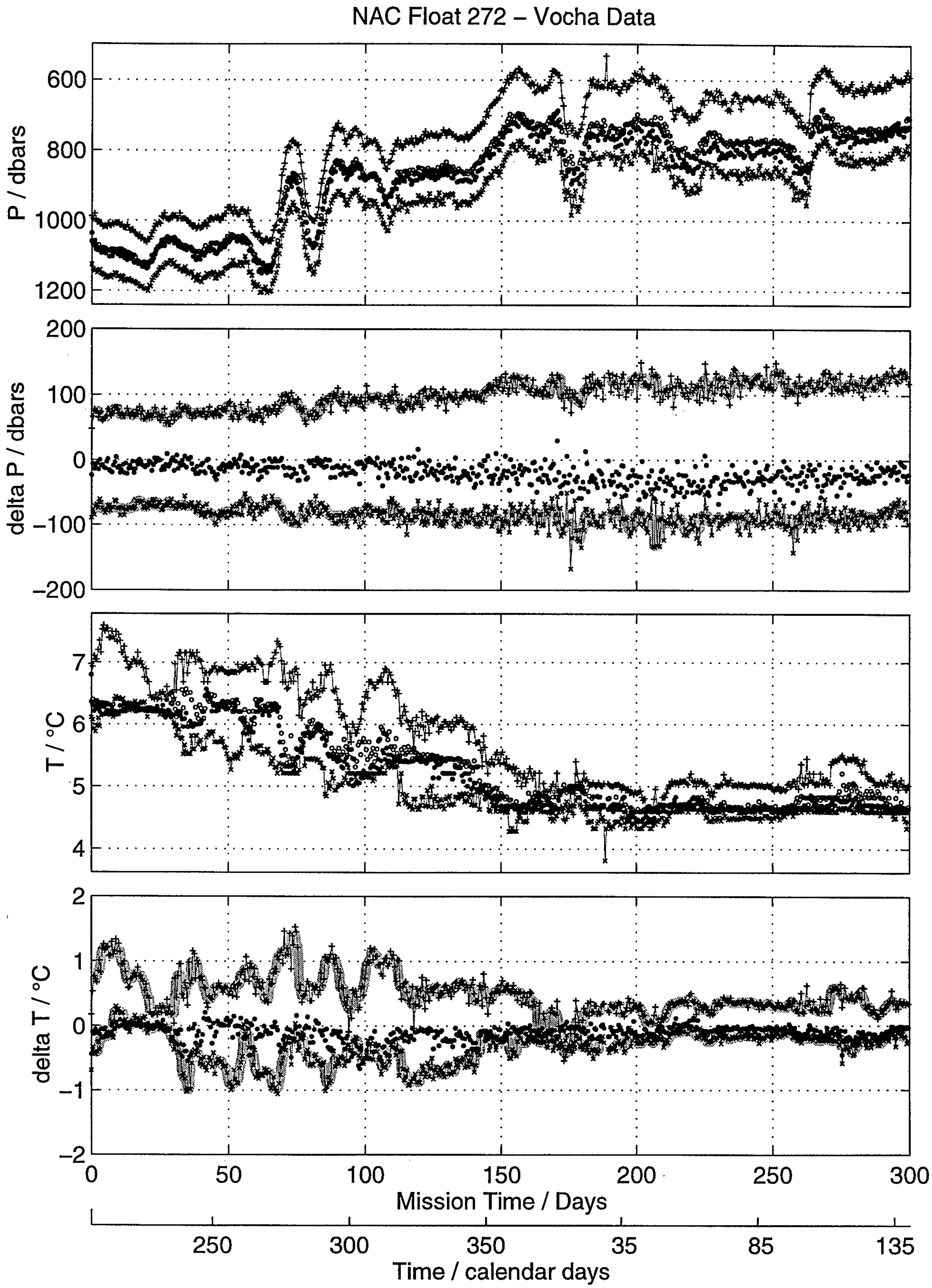


NAC Float 270 – YearDay Start 206.5
Latitude / °N
Longitude / °W
44
43.5
43
42.5
42
41.5
41
40.5
40
39.5
48
46
44
42
40
0
50
P / dbars
400
600
800
T / °C
9.4
9.2
9
8.8
8.6
8.4
8.2
|V| / cm/s
50
0
10
20
30
40
60
Time / float days
210
220
230
240
250
260
Time / calendar days

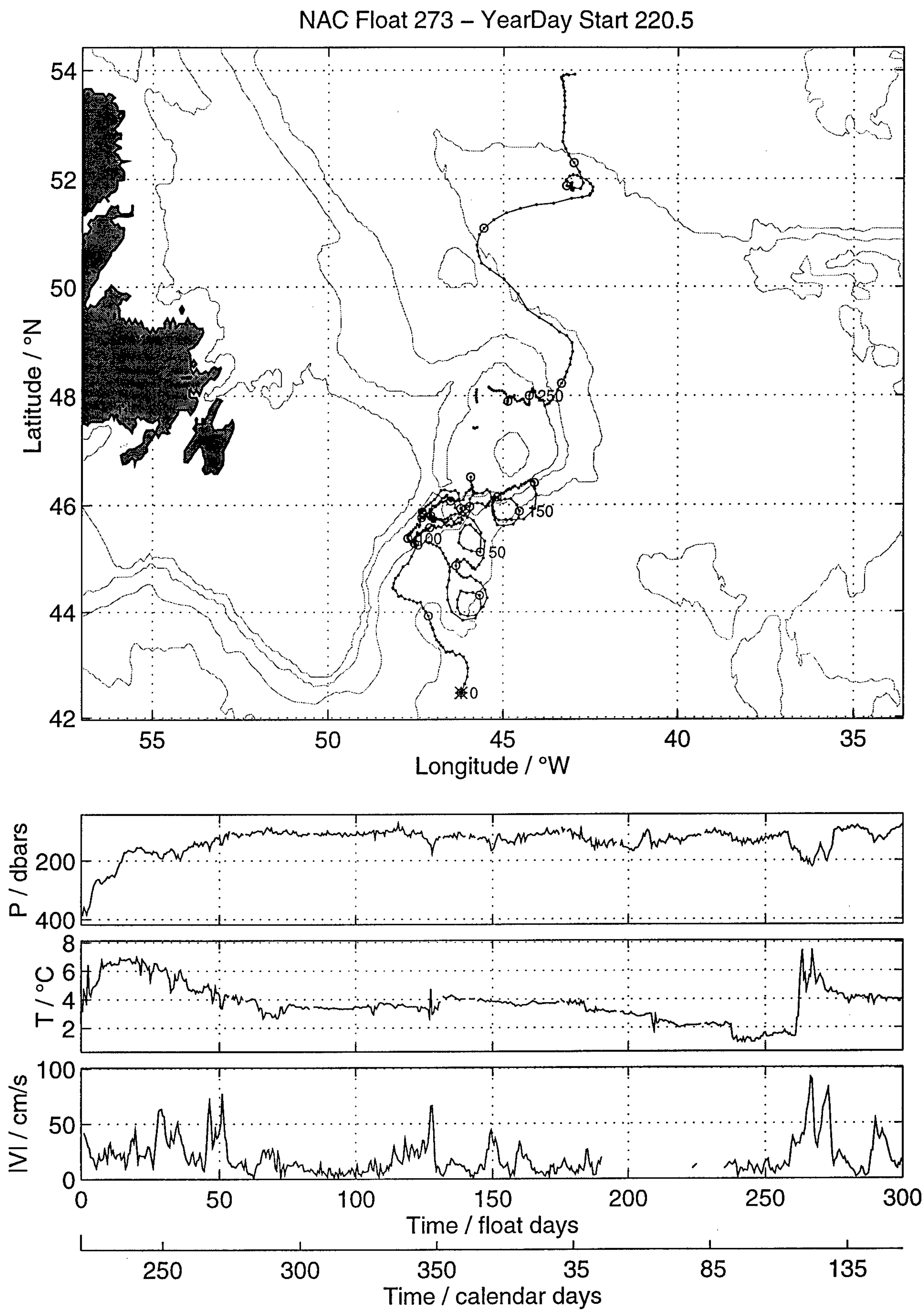

NAC Float 270 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days

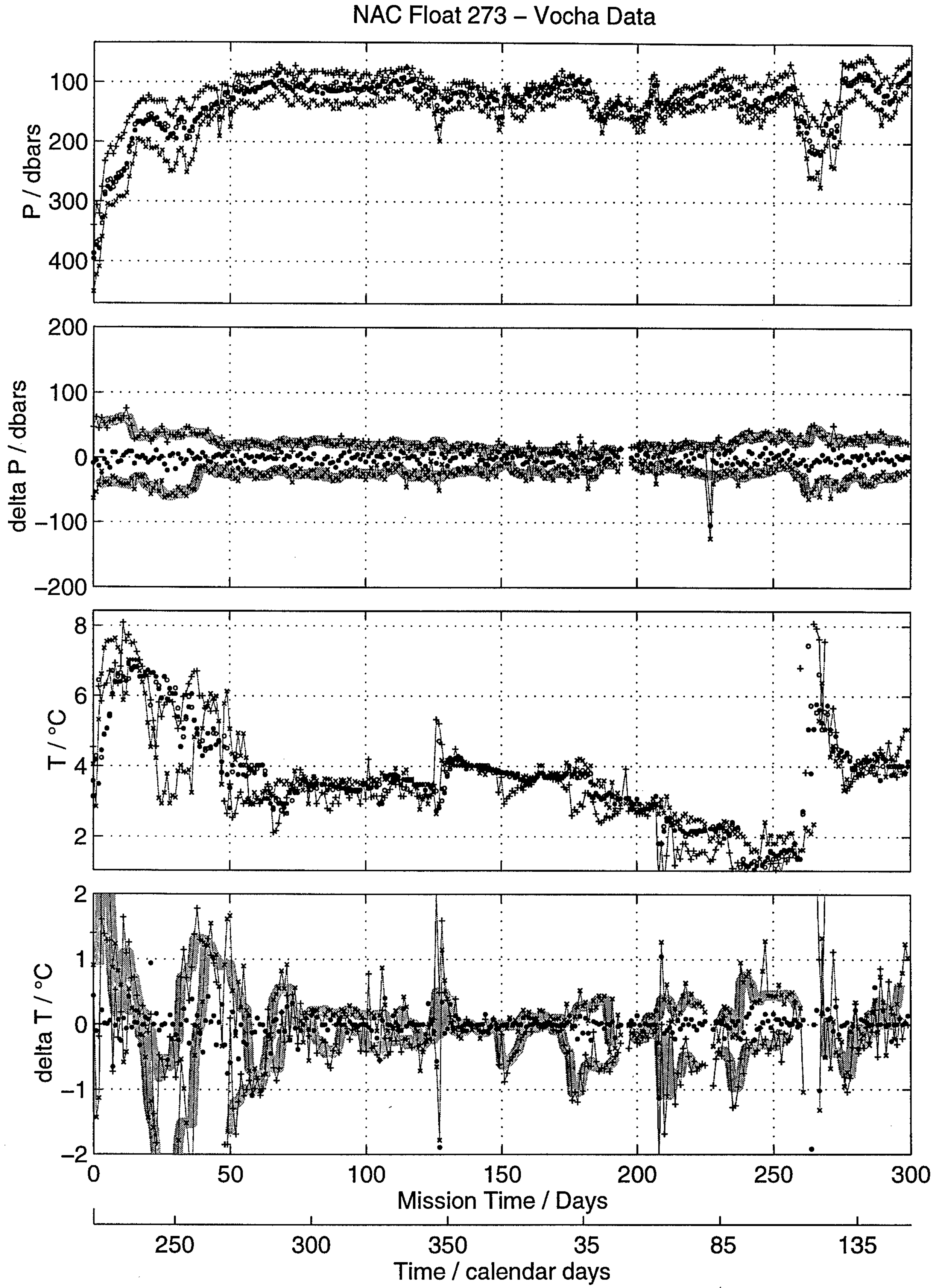


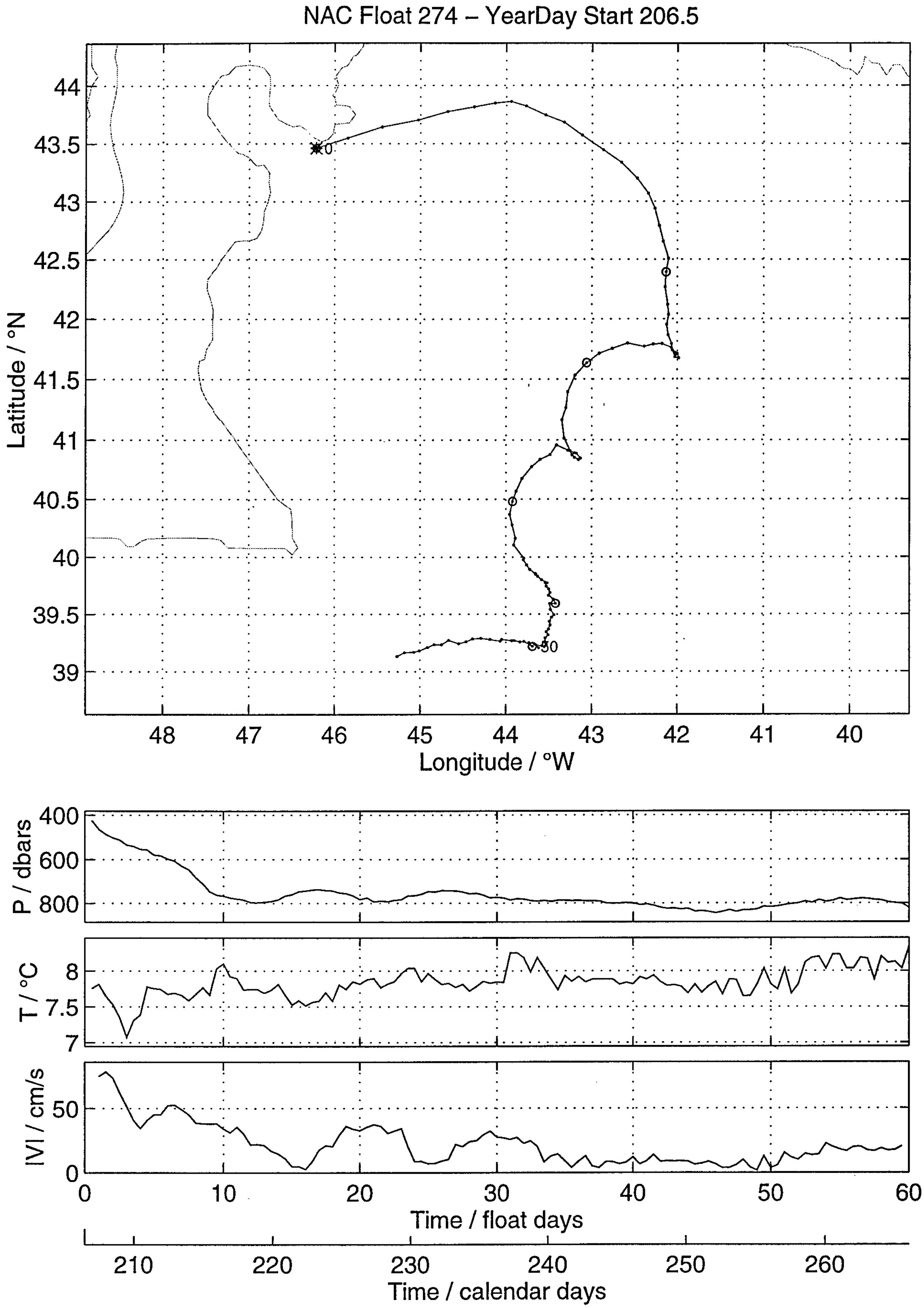
NAC Float 272 – YearDay Start 206.0
Latitude / °N
Longitude / °W
150
250
200
100
0
50
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days



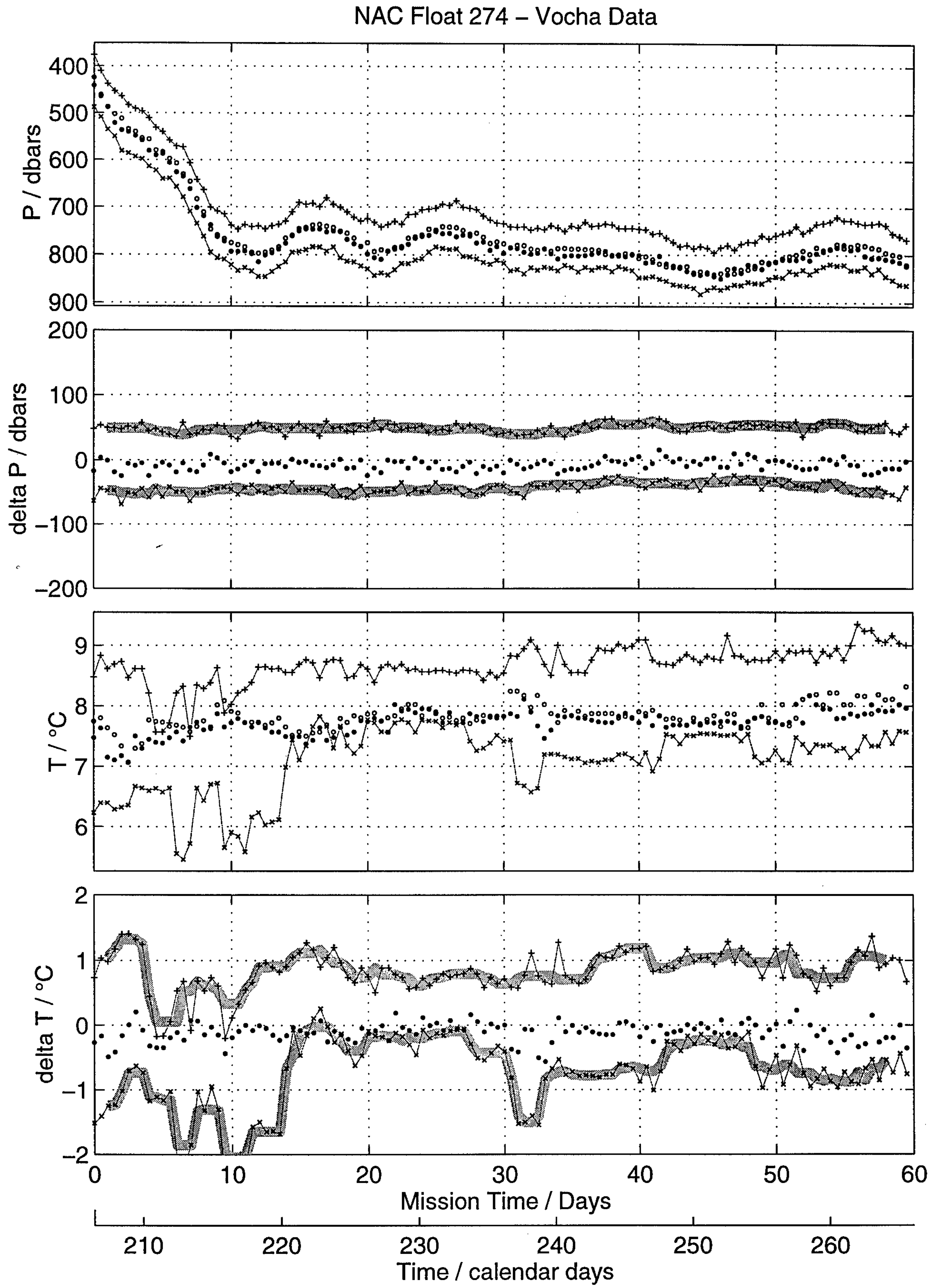
NAC Float 272 – Vocha Data
P / dbars
600
800
1000
1200
delta P / dbars
200
100
0
−100
−200
T / °C
7
6
5
4
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

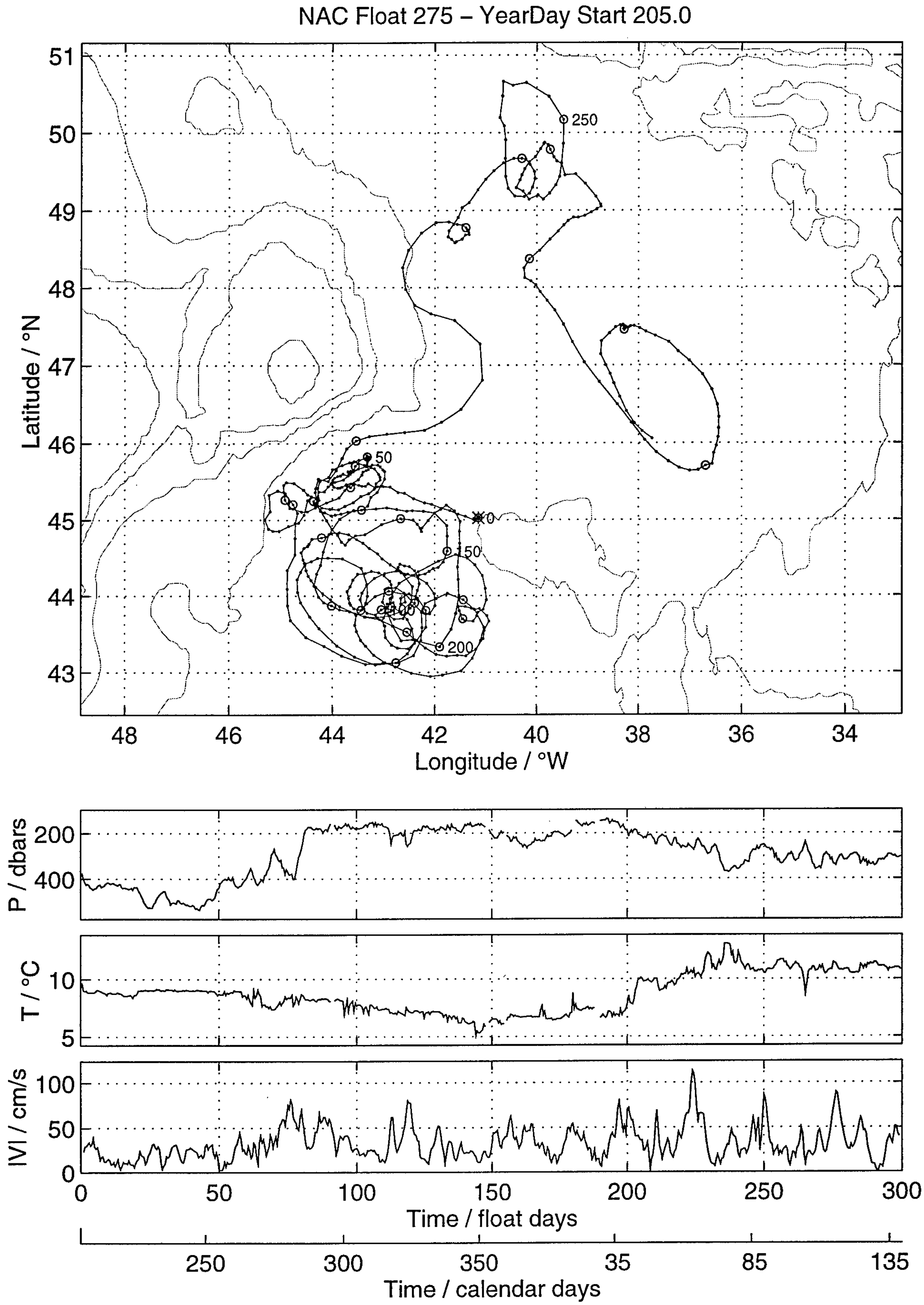

NAC Float 273 – YearDay Start 220.5
Latitude / °N
Longitude / °W
54
52
50
48
46
44
42
55
50
45
40
35
250
150
100
50
0
P / dbars
200
400
T / °C
8
6
4
2
|V| / cm/s
100
50
0
Time / float days
0
50
100
150
200
250
300
Time / calendar days
250
300
350
35
85
135

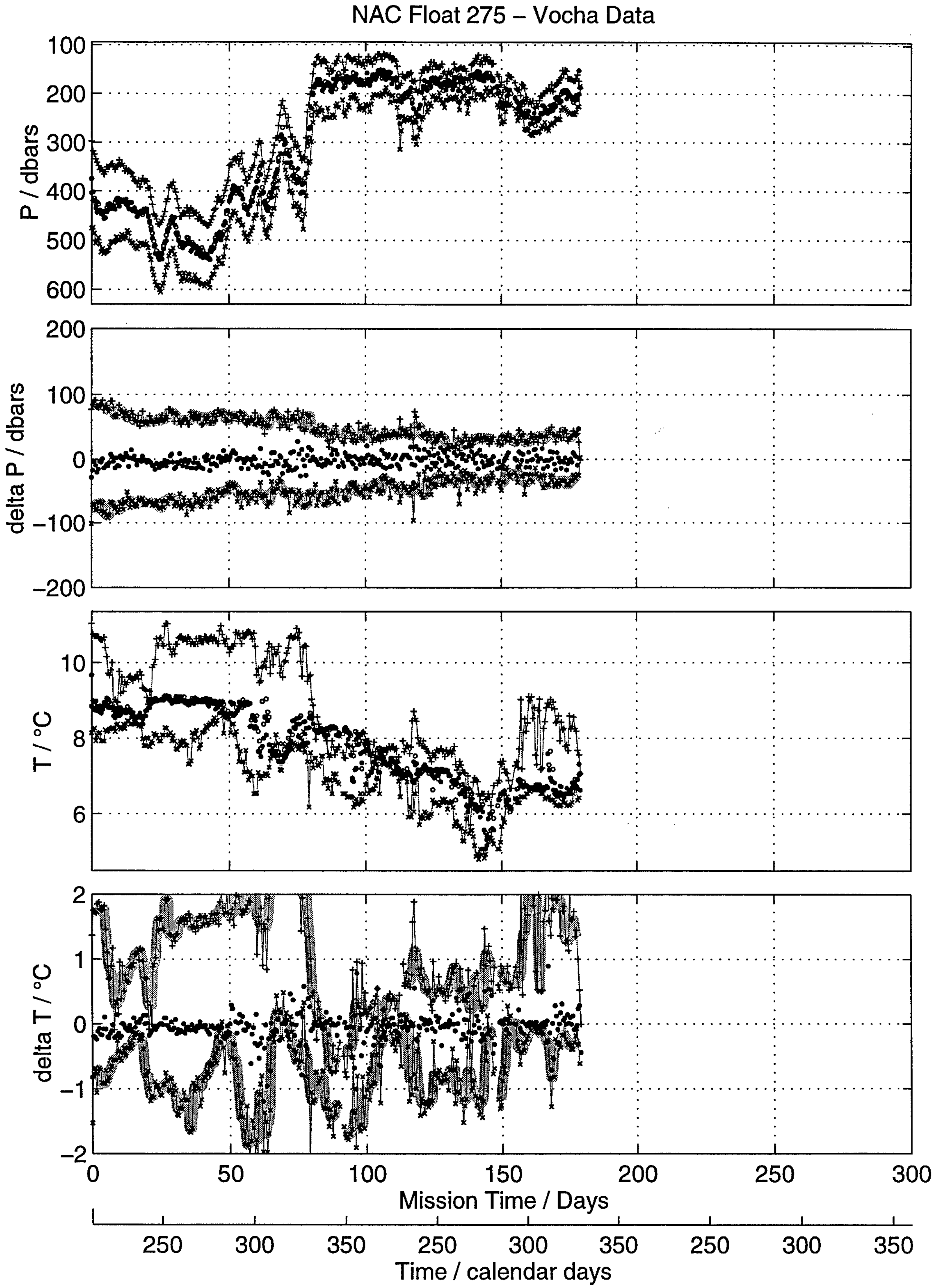

NAC Float 273 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days



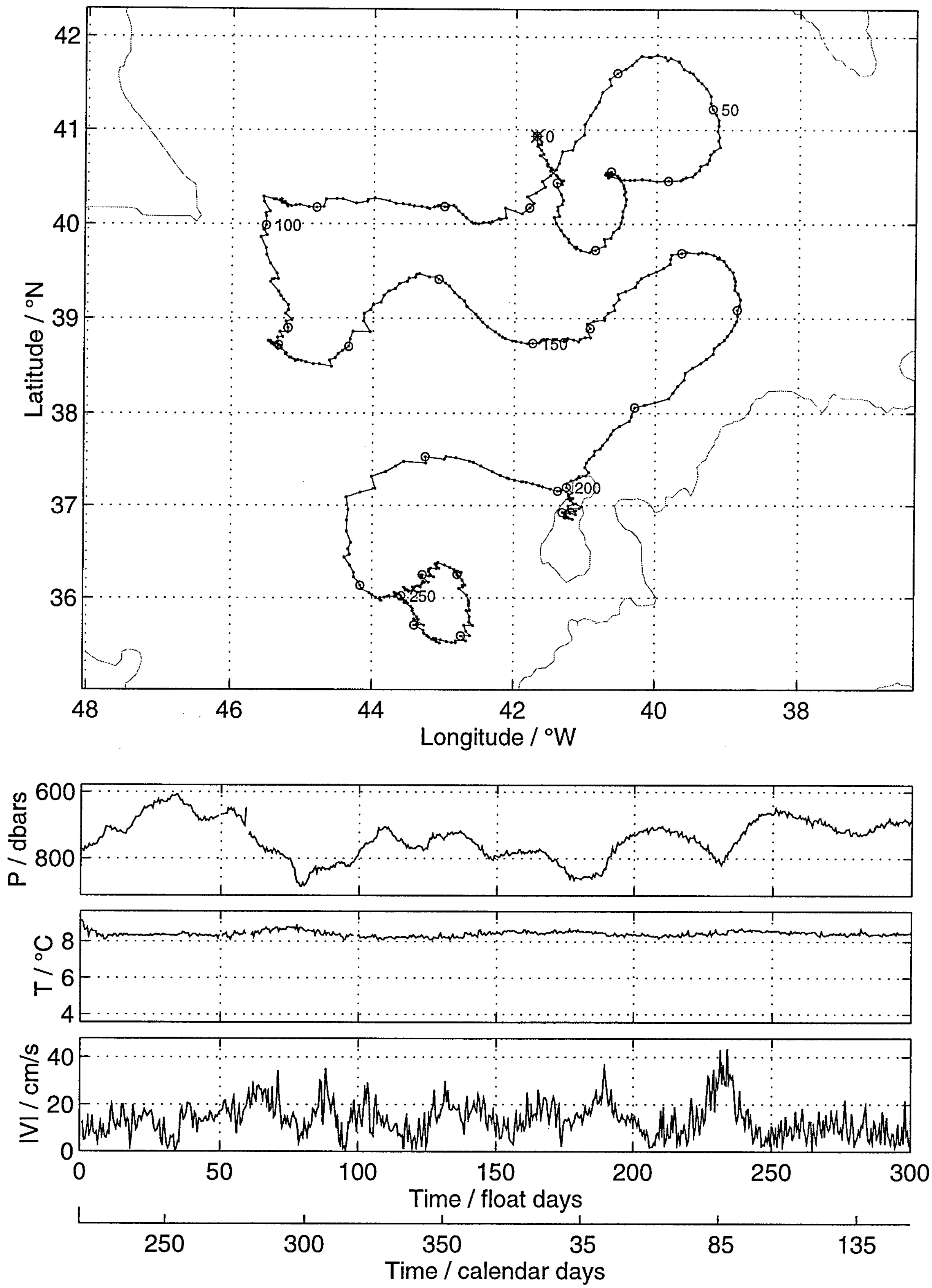
NAC Float 274 – YearDay Start 206.5
Latitude / °N
Longitude / °W
0
50
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

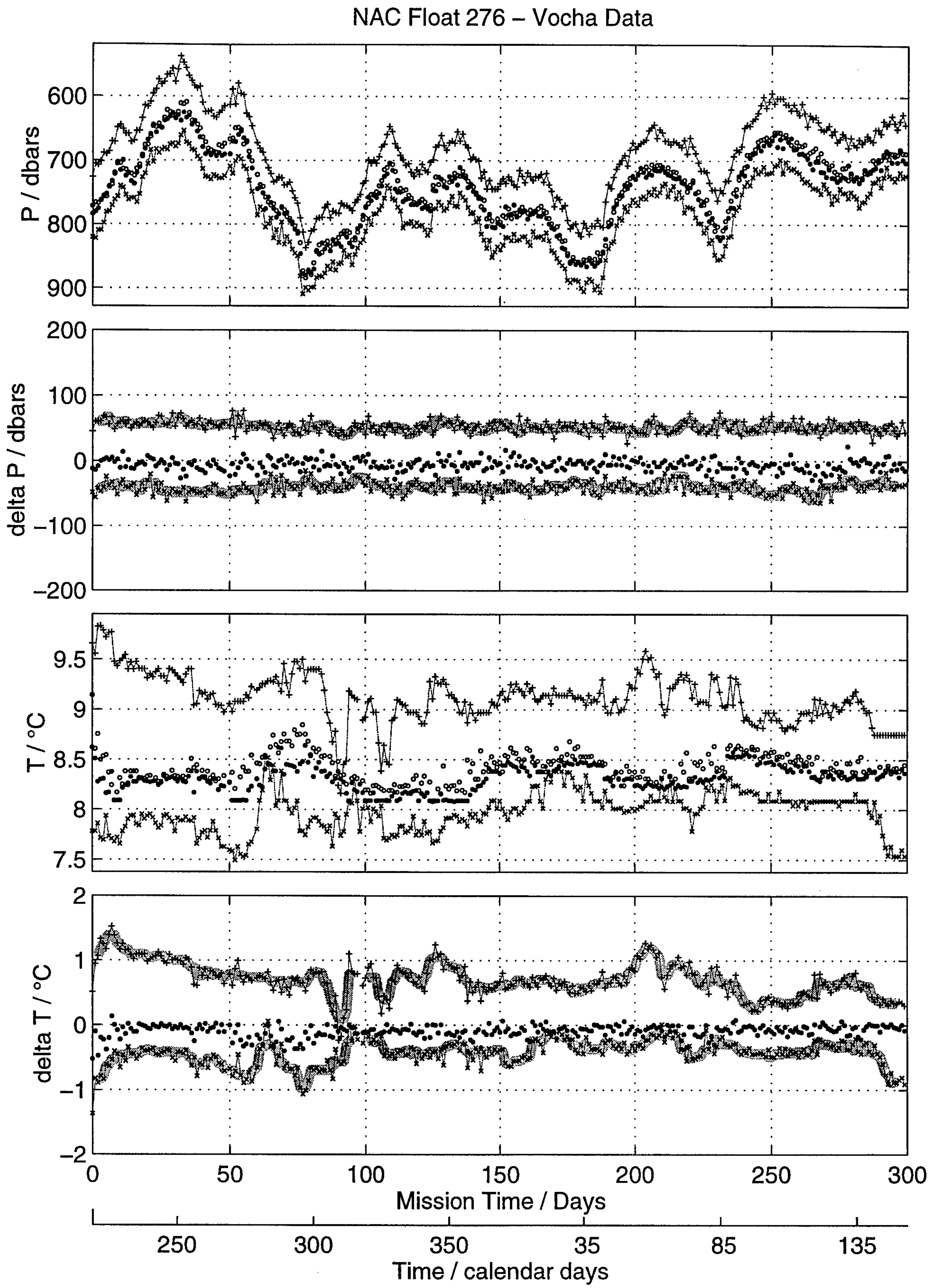

NAC Float 274 – Vocha Data
P / dbars
400
500
600
700
800
900
delta P / dbars
200
100
0
−100
−200
T / °C
9
8
7
6
delta T / °C
2
1
0
−1
−2
0
10
20
30
40
50
60
Mission Time / Days
210
220
230
240
250
260
Time / calendar days

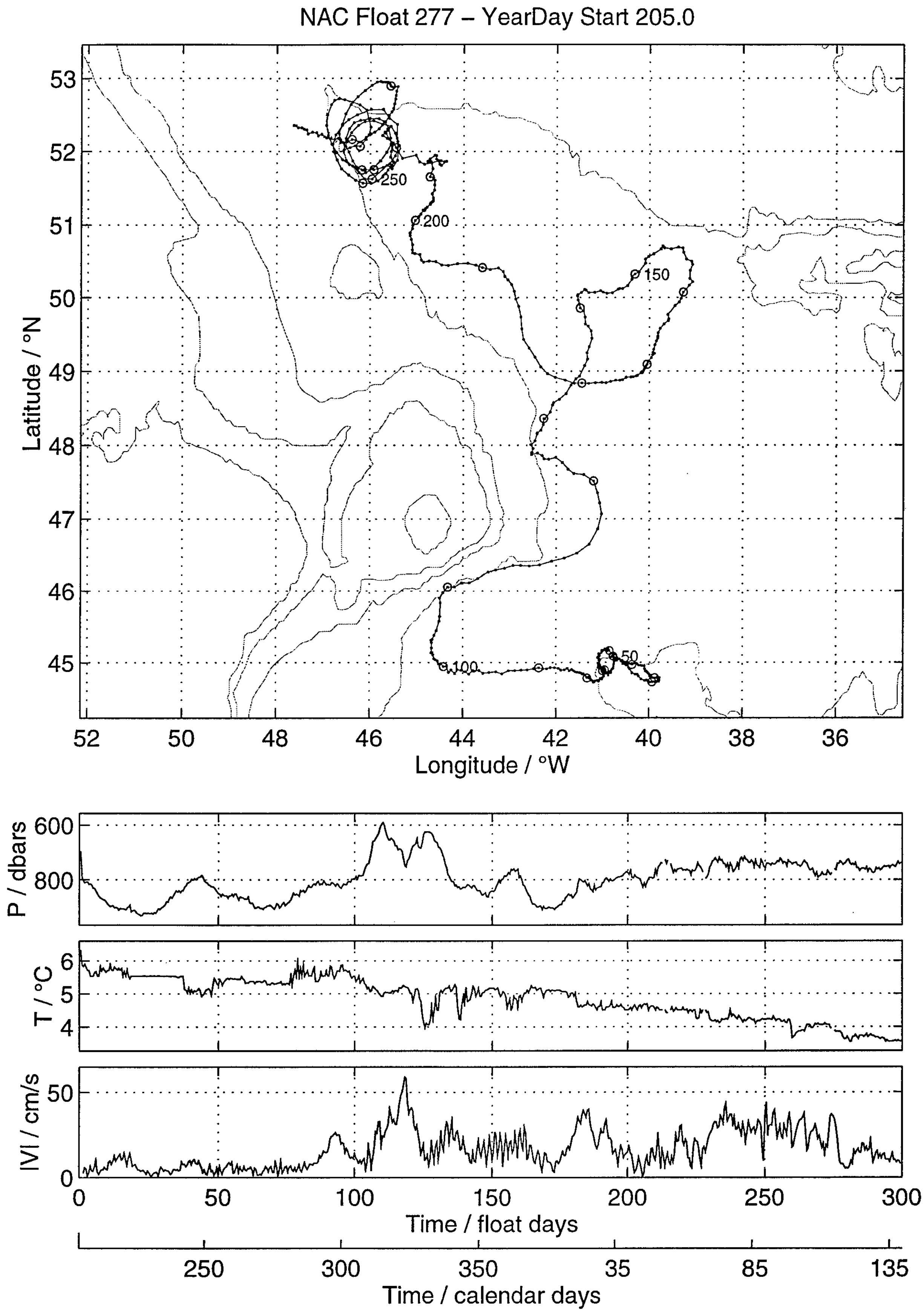

NAC Float 275 – YearDay Start 205.0
Latitude / °N
Longitude / °W
51
50
49
48
47
46
45
44
43
48
46
44
42
40
38
36
34
250
50
0
150
200
P / dbars
200
400
T / °C
10
5
|V| / cm/s
100
50
0
0
50
100
150
200
250
300
Time / float days
250
300
350
35
85
135
Time / calendar days


NAC Float 275 – Vocha Data
P / dbars
100
200
300
400
500
600
delta P / dbars
200
100
0
−100
−200
T / °C
10
8
6
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
250
300
350
250
300
350
Time / calendar days

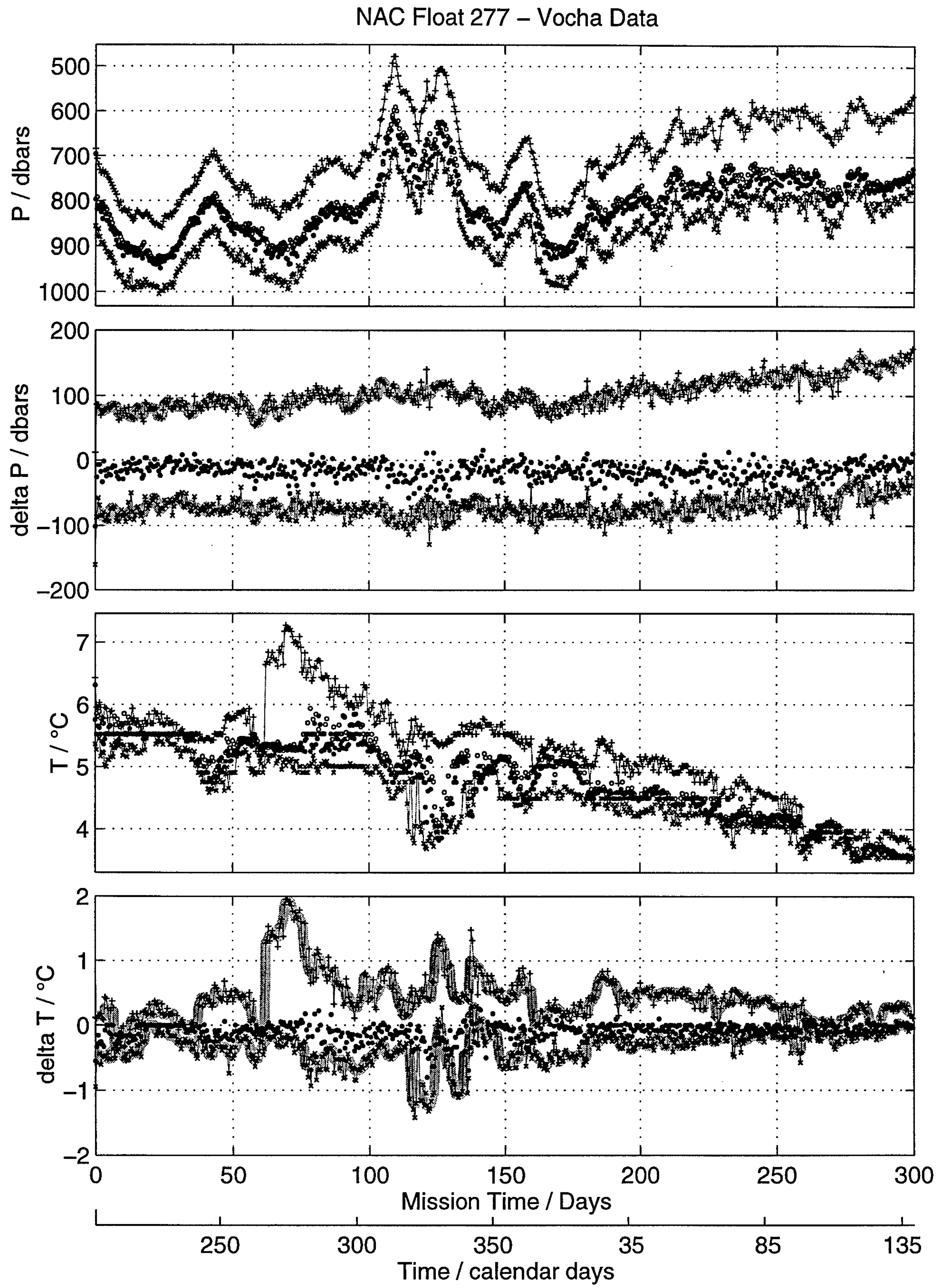
NAC Float 276 – YearDay Start 219.5

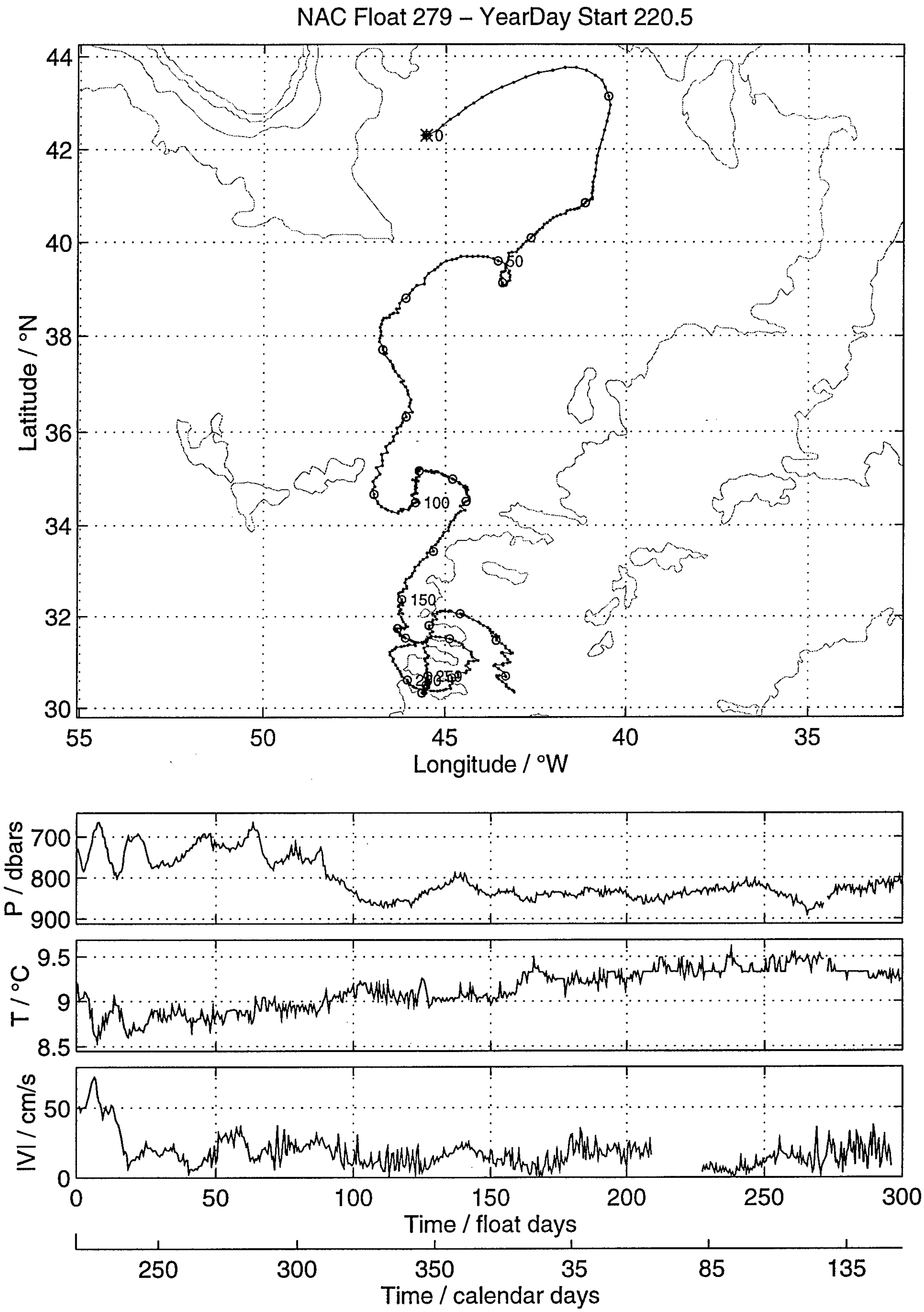


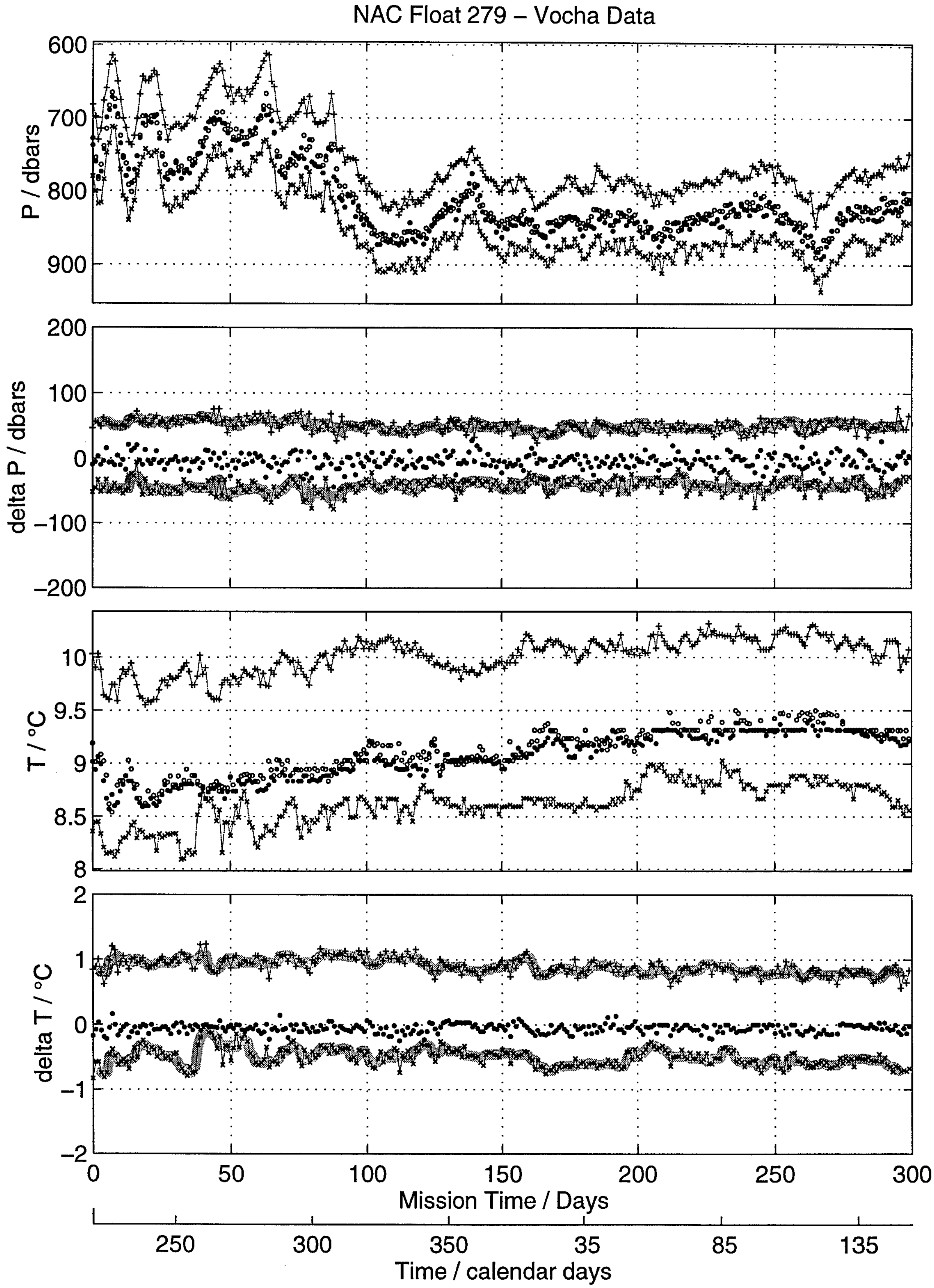

NAC Float 276 – Vocha Data
P / dbars
600
700
800
900
delta P / dbars
200
100
0
−100
−200
T / °C
9.5
9
8.5
8
7.5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days



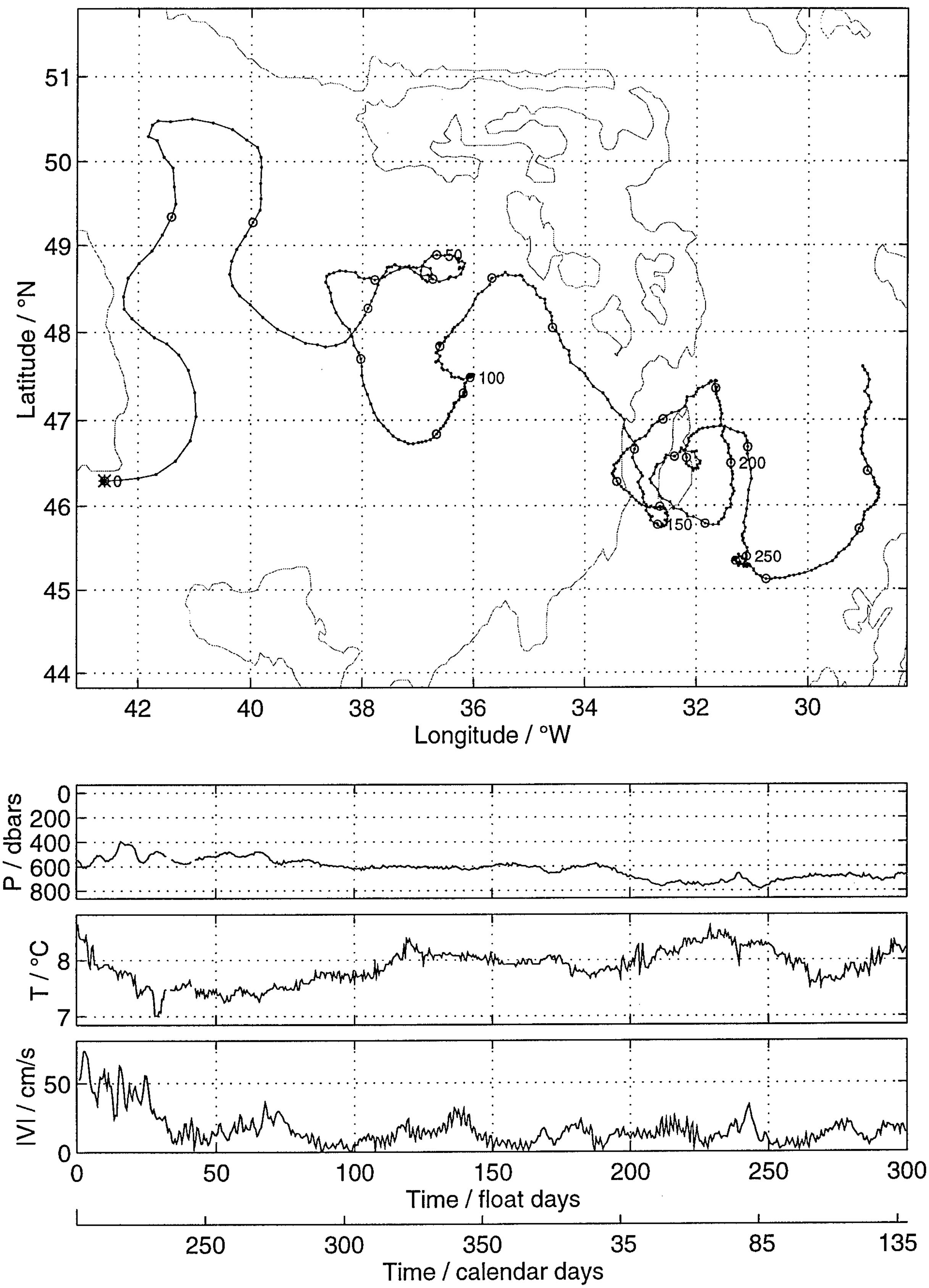
NAC Float 277 – YearDay Start 205.0
Latitude / °N
Longitude / °W
53
52
51
50
49
48
47
46
45
52
50
48
46
44
42
40
38
36
250
200
150
100
50
P / dbars
600
800
T / °C
6
5
4
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
250
300
350
35
85
135
Time / calendar days

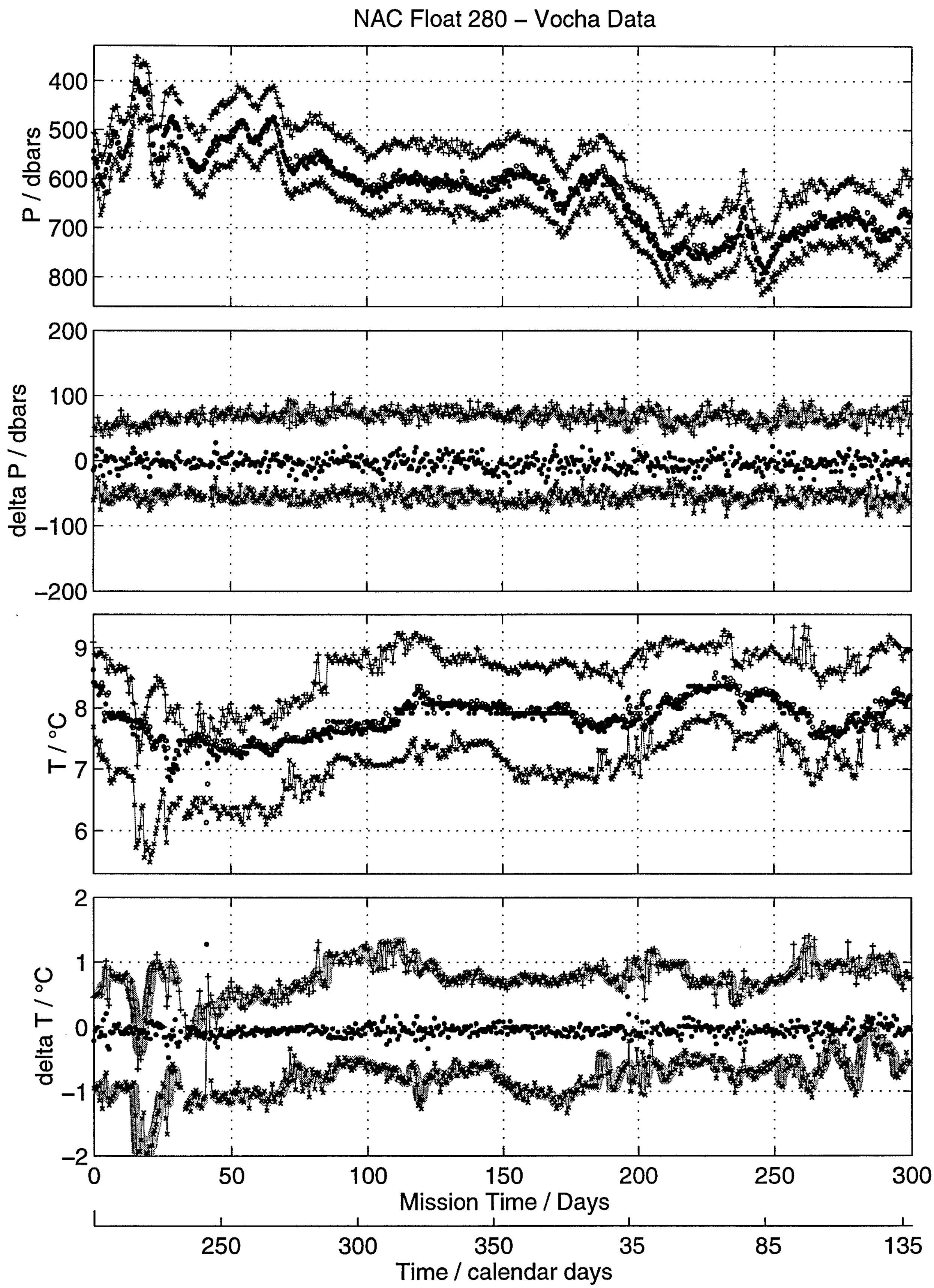

NAC Float 277 – Vocha Data
P / dbars
500
600
700
800
900
1000
delta P / dbars
200
100
0
−100
−200
T / °C
7
6
5
4
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

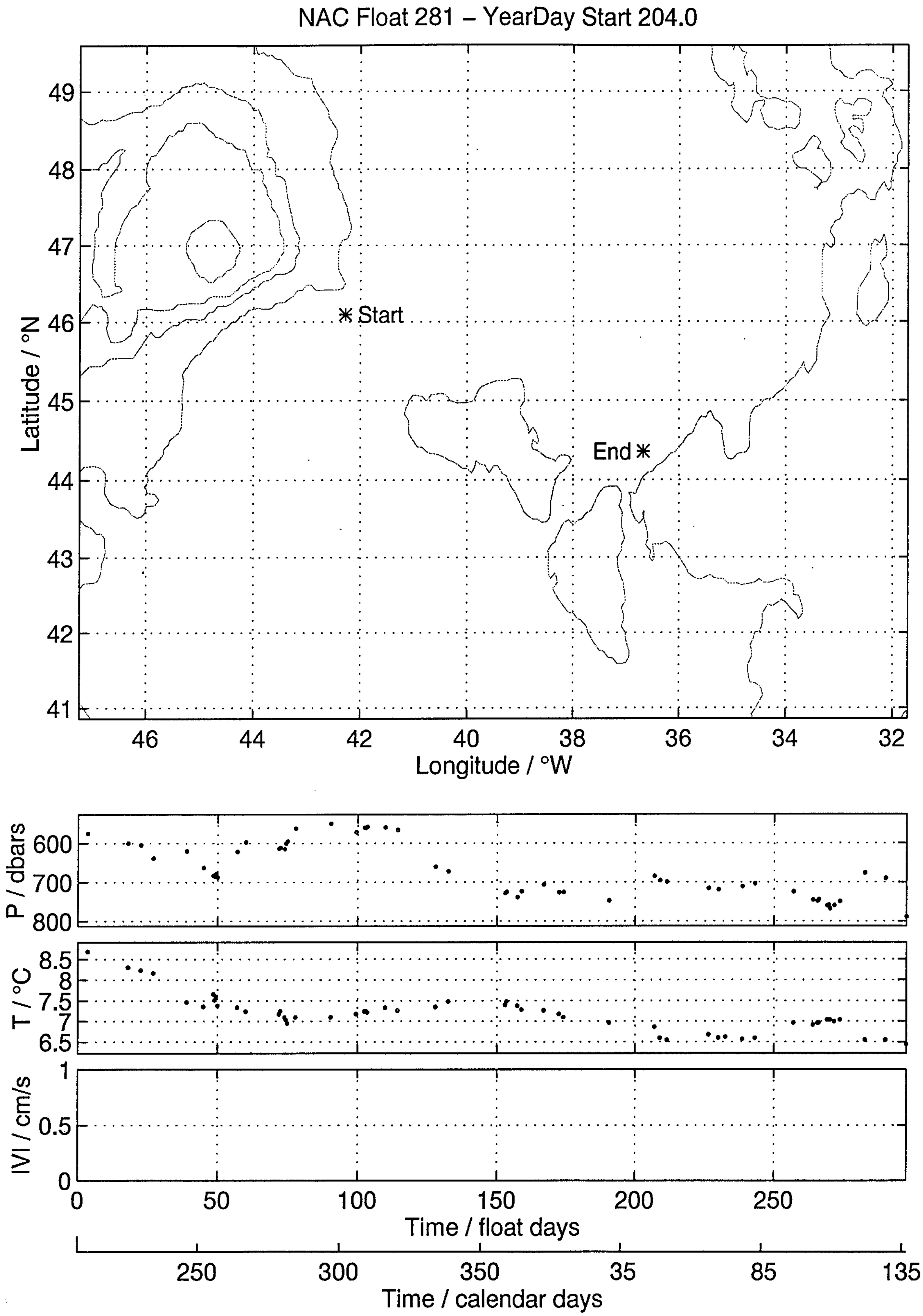

NAC Float 279 – YearDay Start 220.5
Latitude / °N
Longitude / °W
44
42
40
38
36
34
32
30
55
50
45
40
35
0
50
100
150
P / dbars
700
800
900
T / °C
9.5
9
8.5
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
250
300
350
35
85
135
Time / calendar days


NAC Float 279 – Vocha Data
P / dbars
600
700
800
900
delta P / dbars
200
100
0
−100
−200
T / °C
10
9.5
9
8.5
8
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

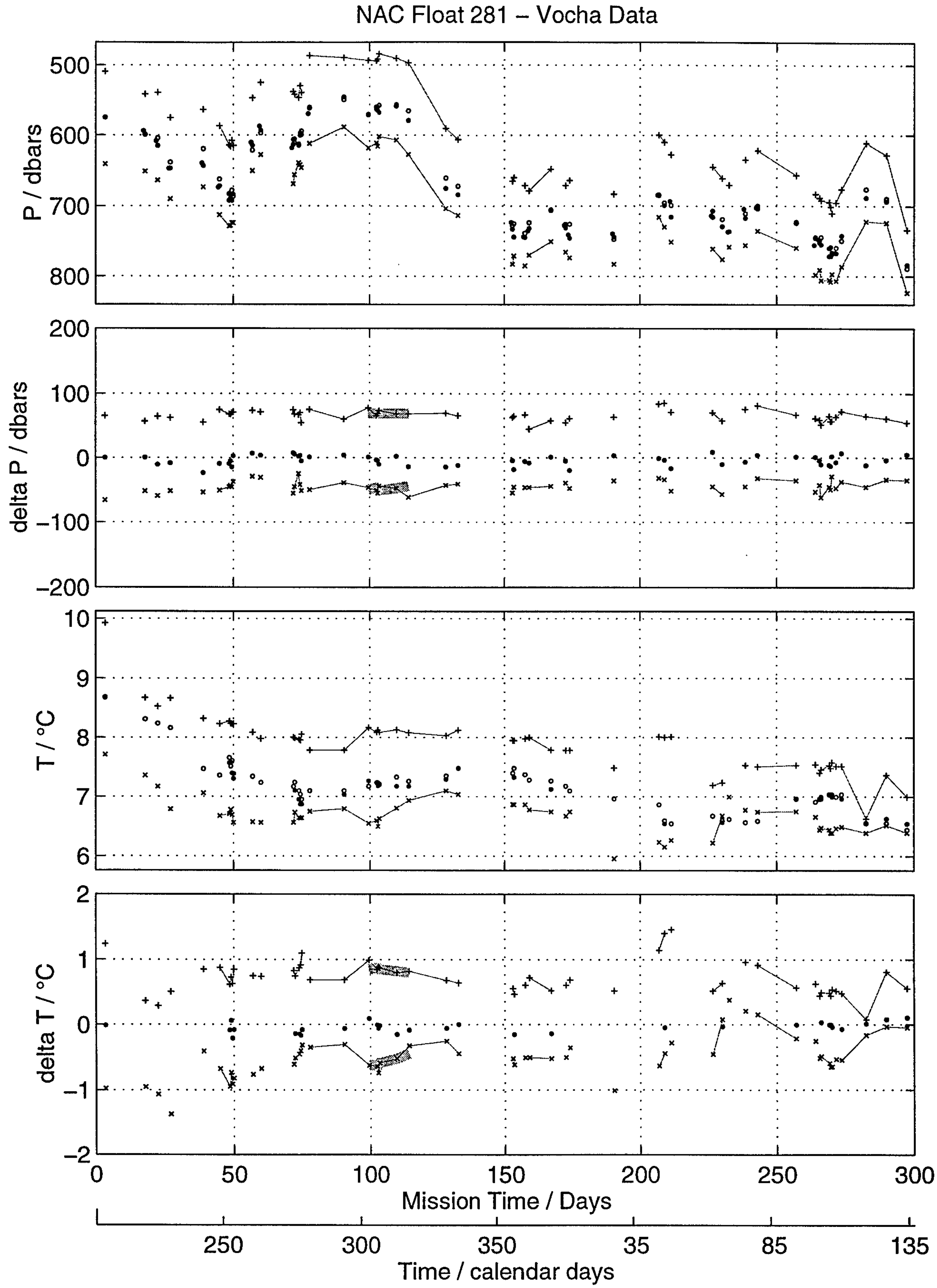
NAC Float 280 – YearDay Start 204.0



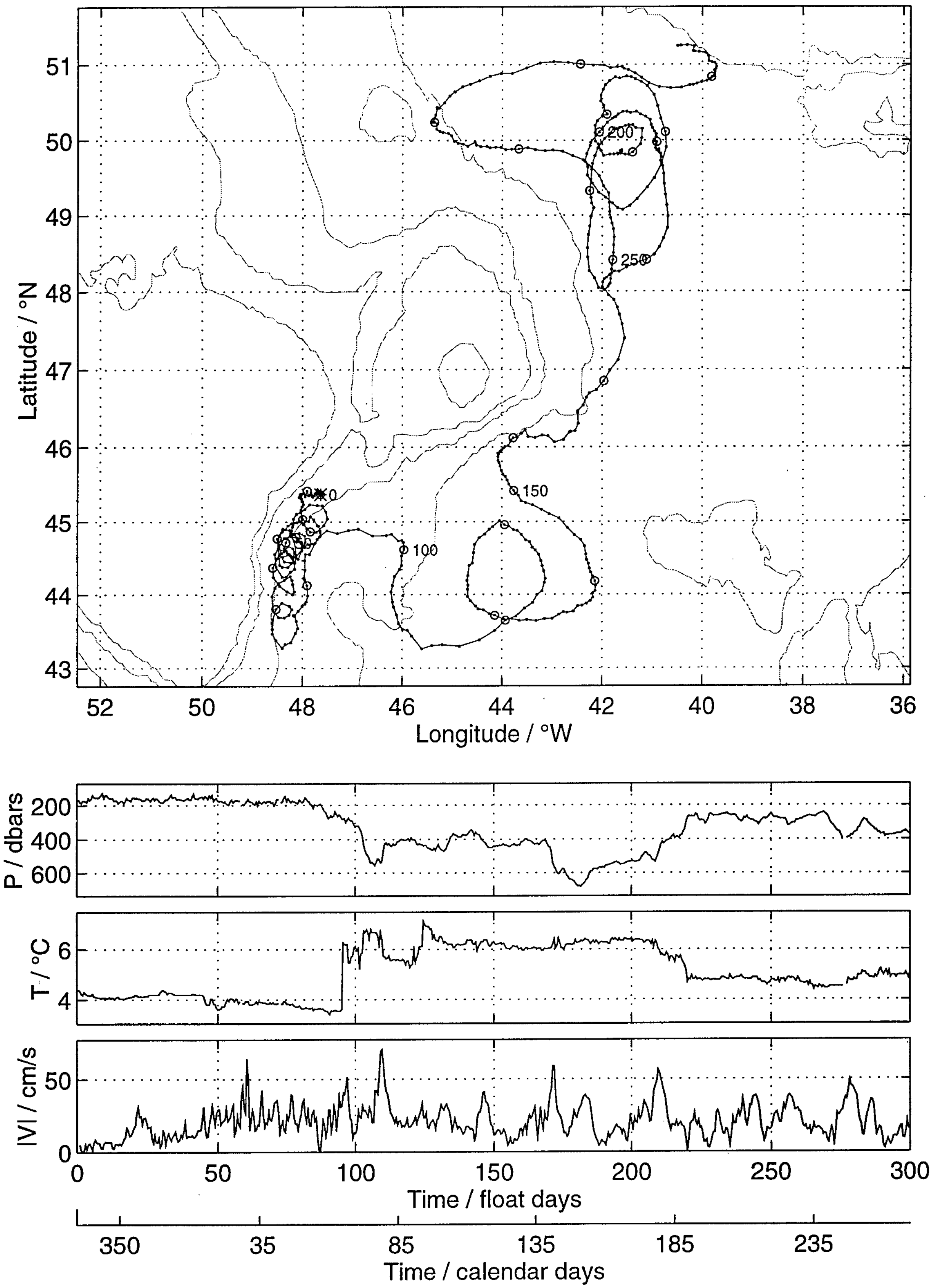

NAC Float 280 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days

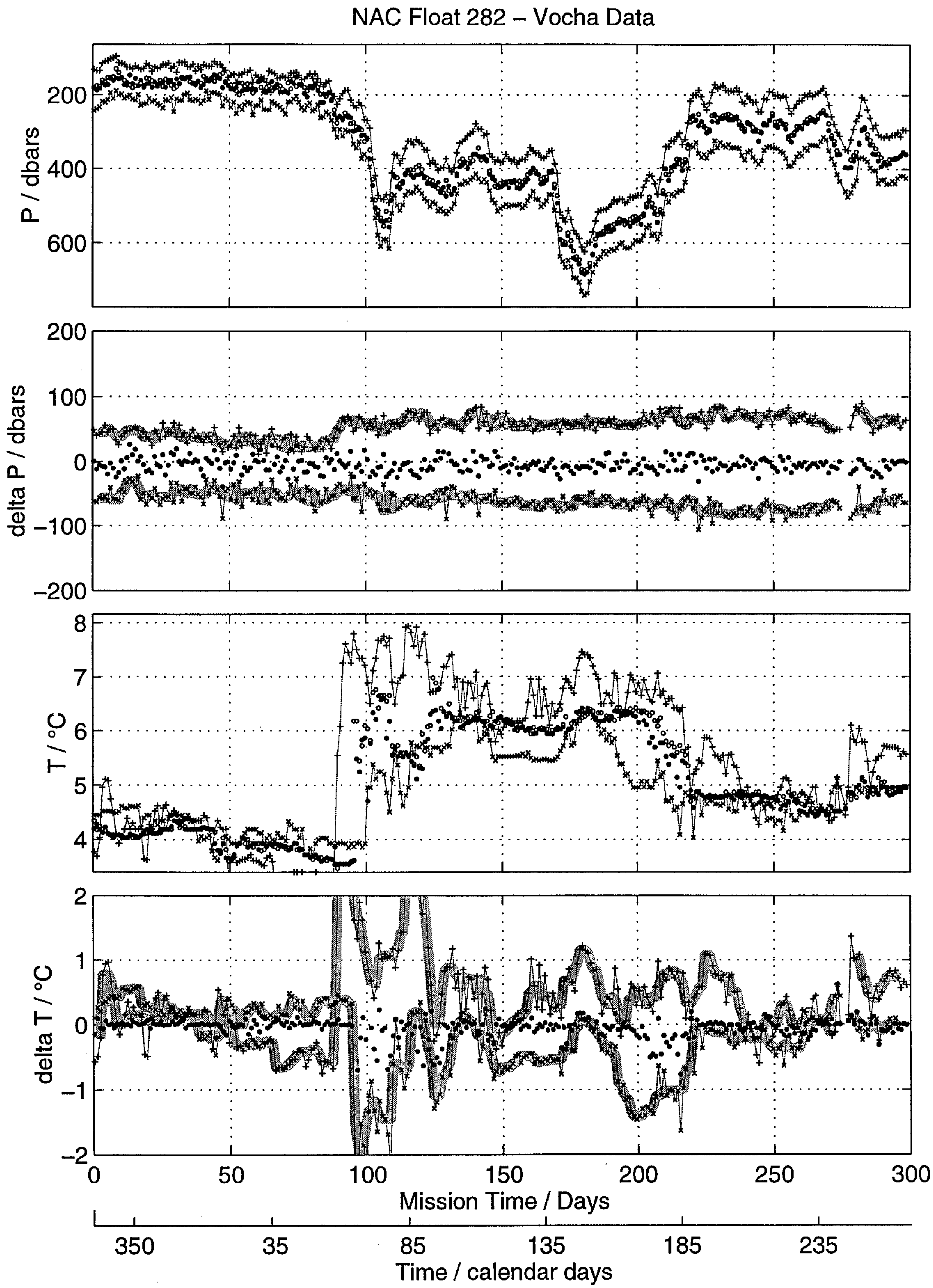


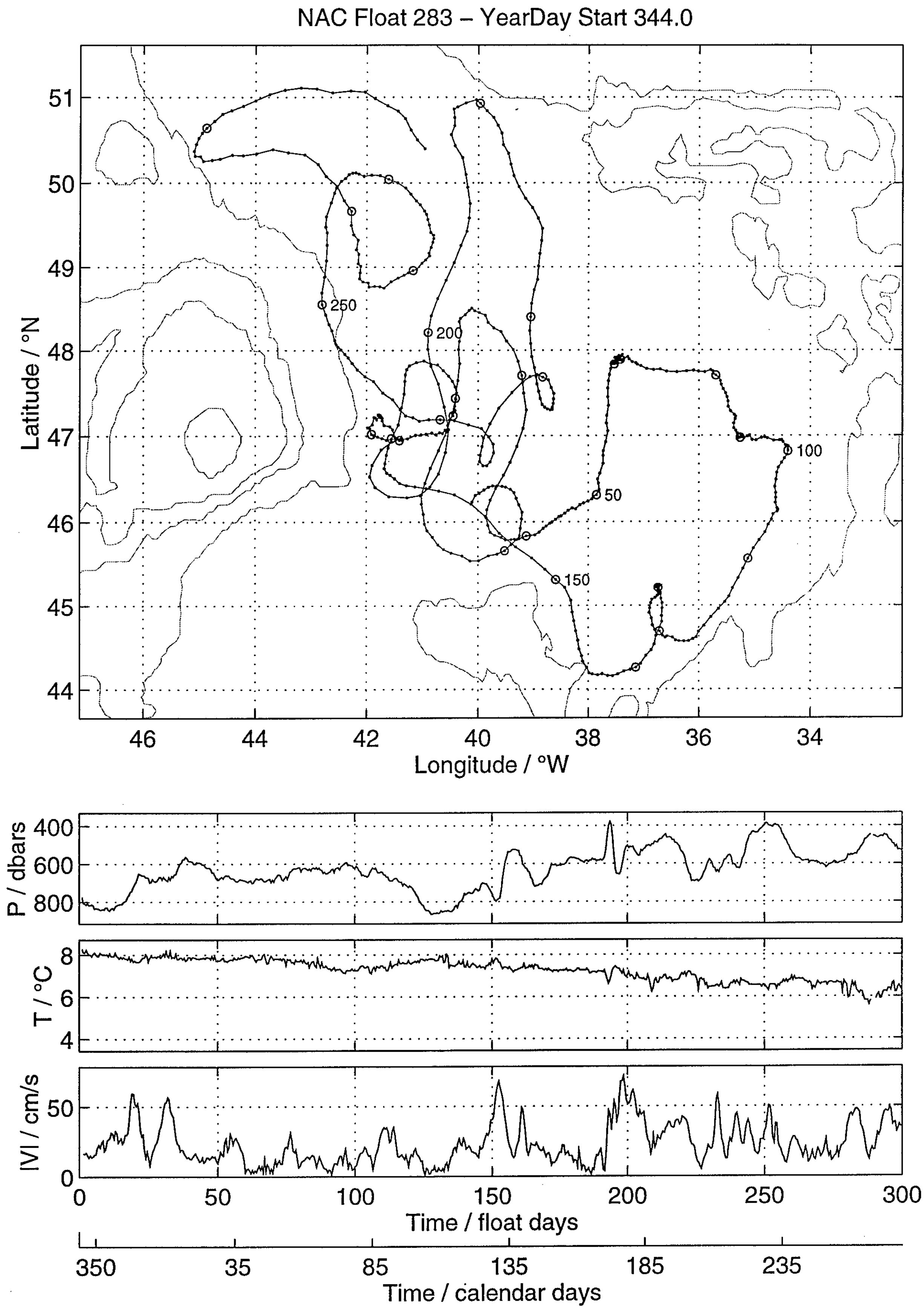
NAC Float 281 – YearDay Start 204.0
Start
End
Latitude / °N
Longitude / °W
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days


NAC Float 281 – Vocha Data
P / dbars
500
600
700
800
delta P / dbars
200
100
0
−100
−200
T / °C
10
9
8
7
6
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
250
300
350
35
85
135
Time / calendar days

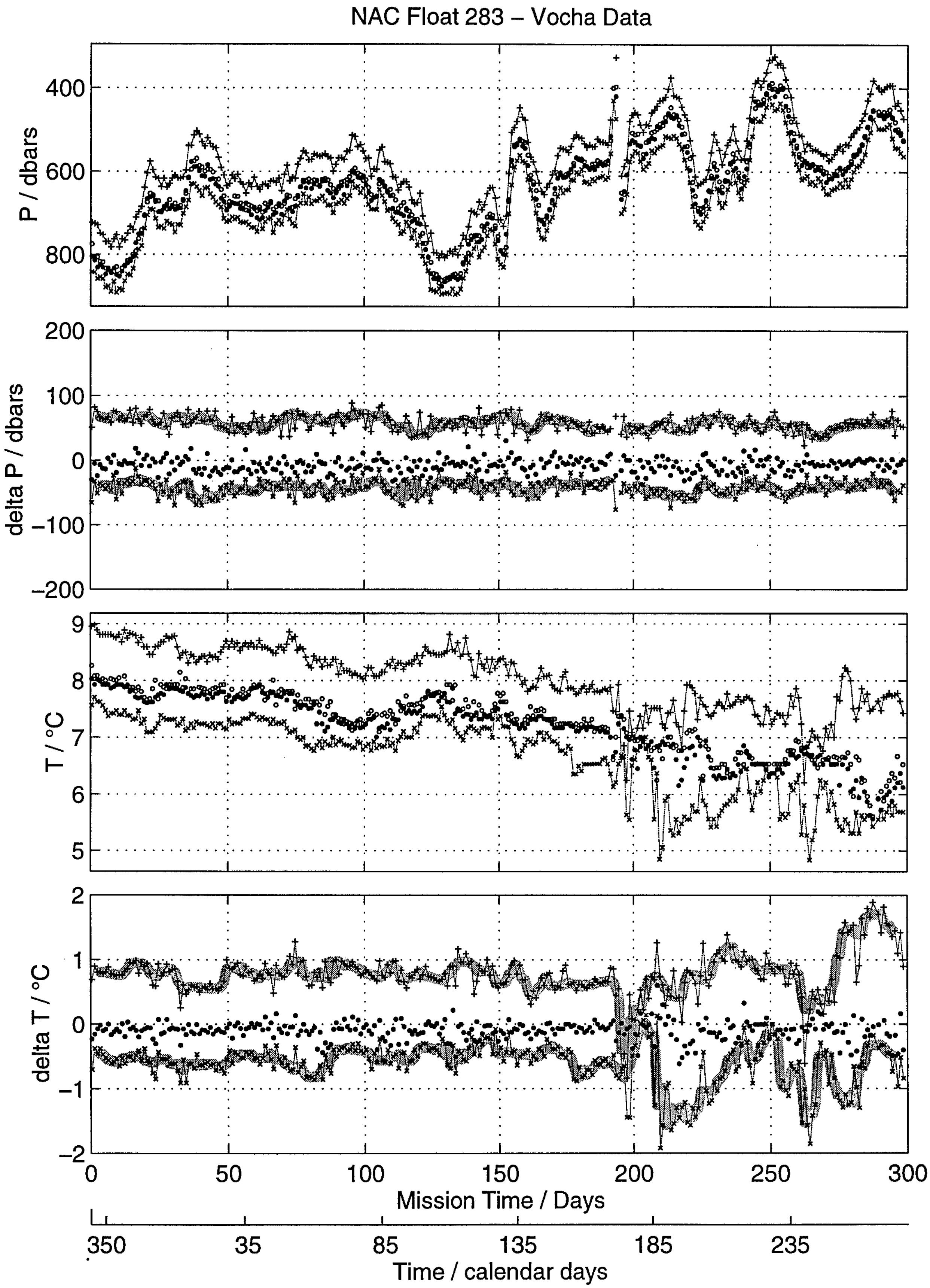
NAC Float 282 – YearDay Start 335.0

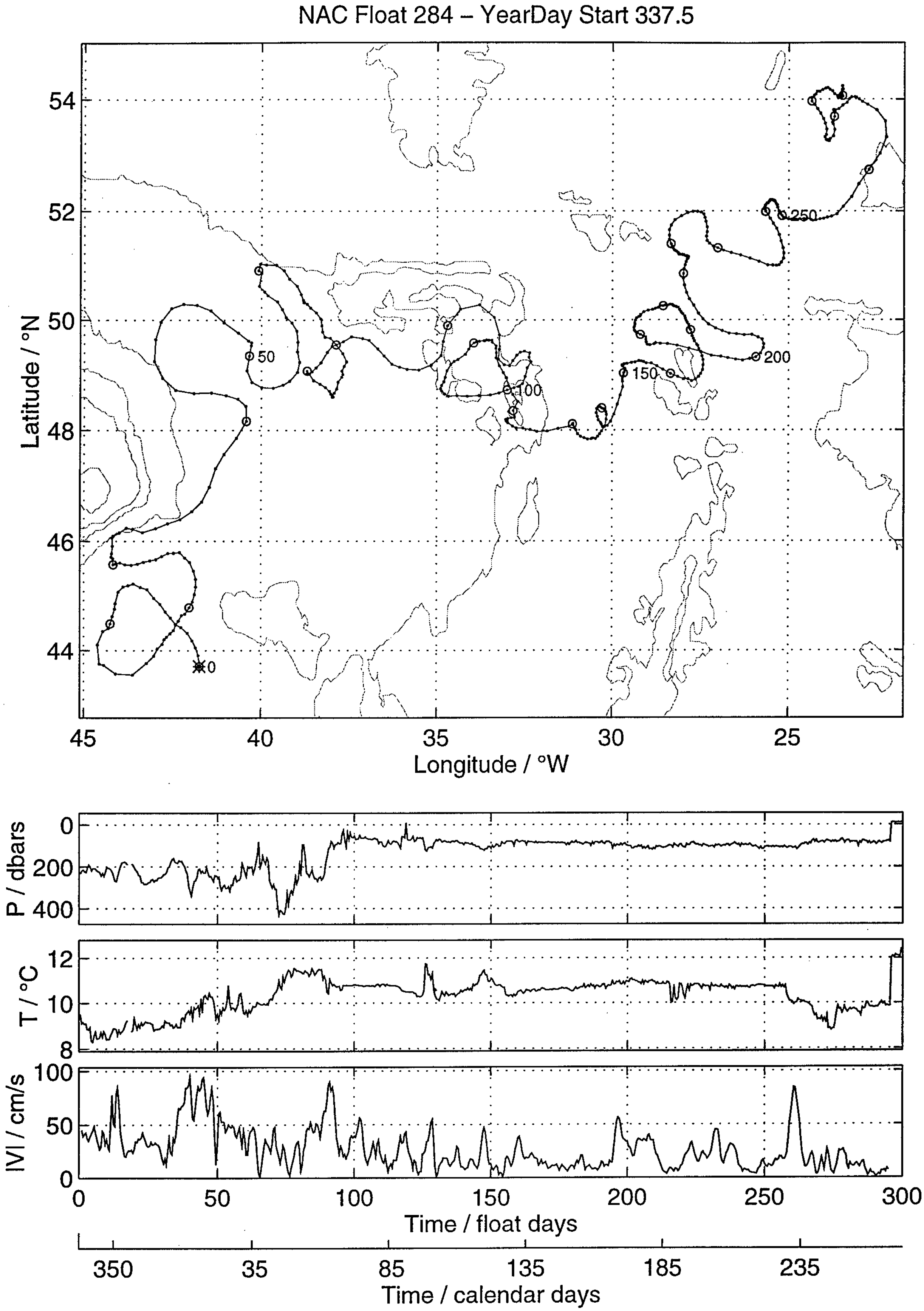



NAC Float 282 – Vocha Data
P / dbars
200
400
600
delta P / dbars
200
100
0
−100
−200
T / °C
8
7
6
5
4
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days



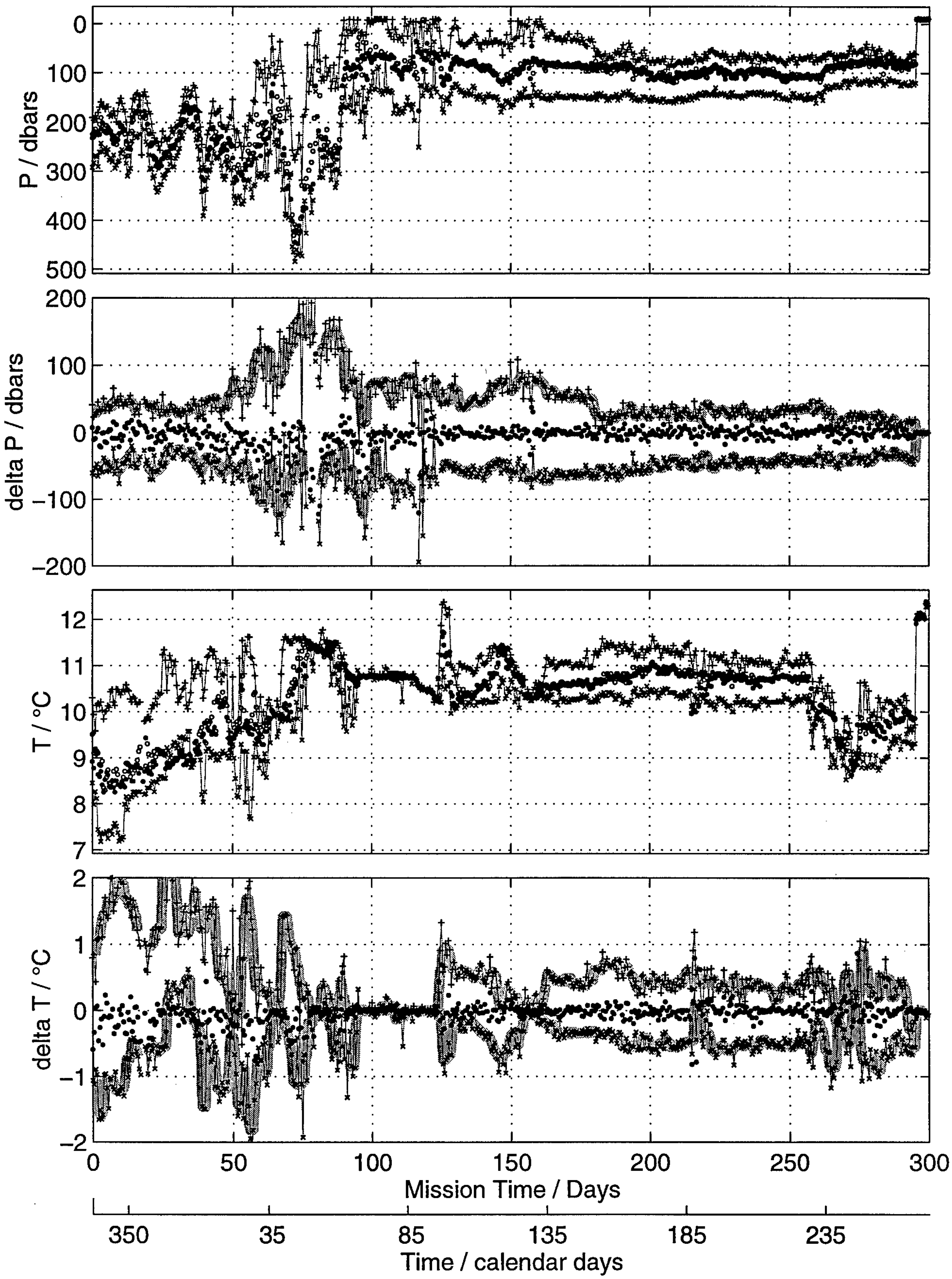
NAC Float 283 – YearDay Start 344.0
Latitude / °N
Longitude / °W
51
50
49
48
47
46
45
44
46
44
42
40
38
36
34
250
200
100
50
150
P / dbars
400
600
800
T / °C
8
6
4
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days

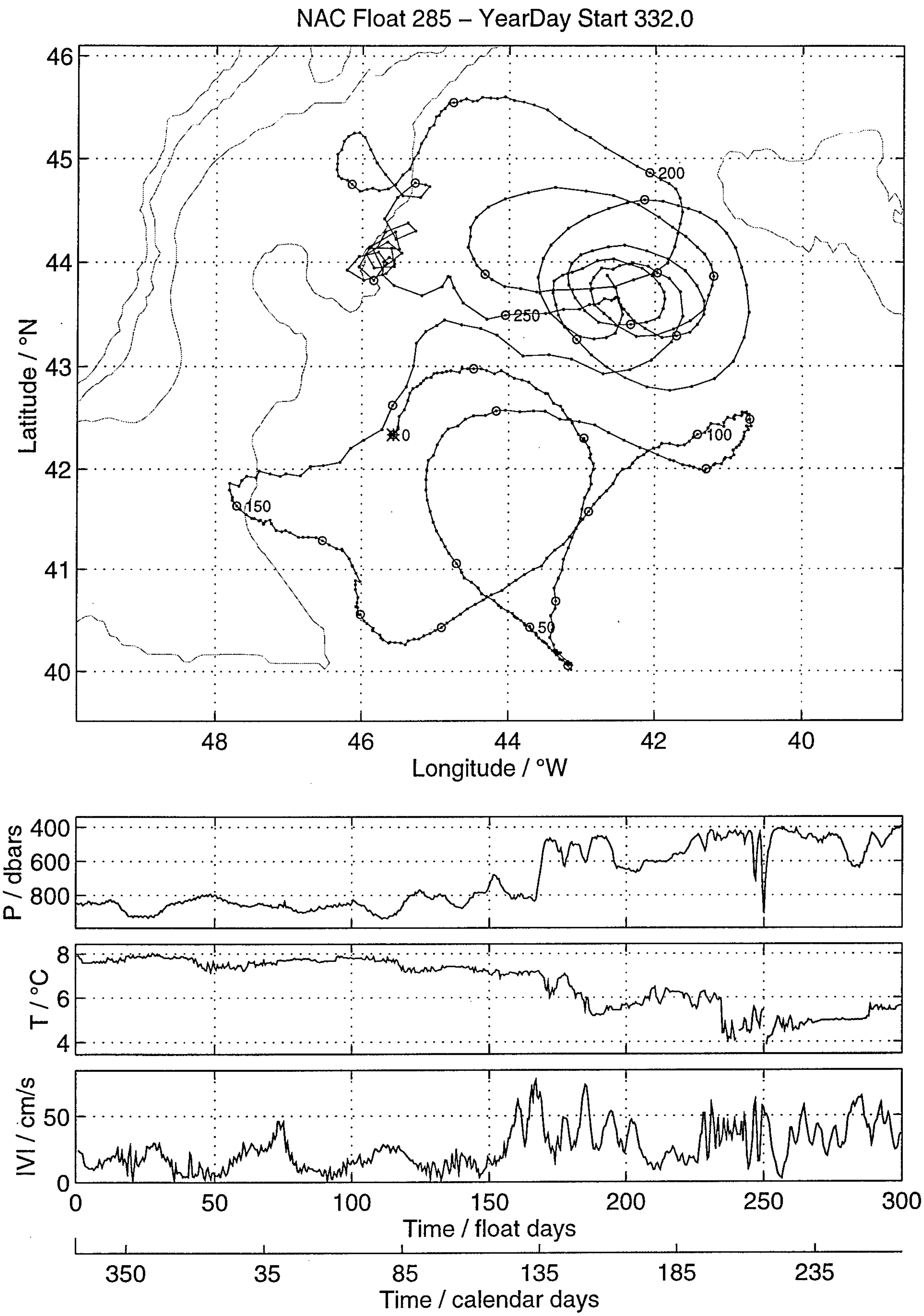

NAC Float 283 – Vocha Data
P / dbars
400
600
800
delta P / dbars
200
100
0
−100
−200
T / °C
9
8
7
6
5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

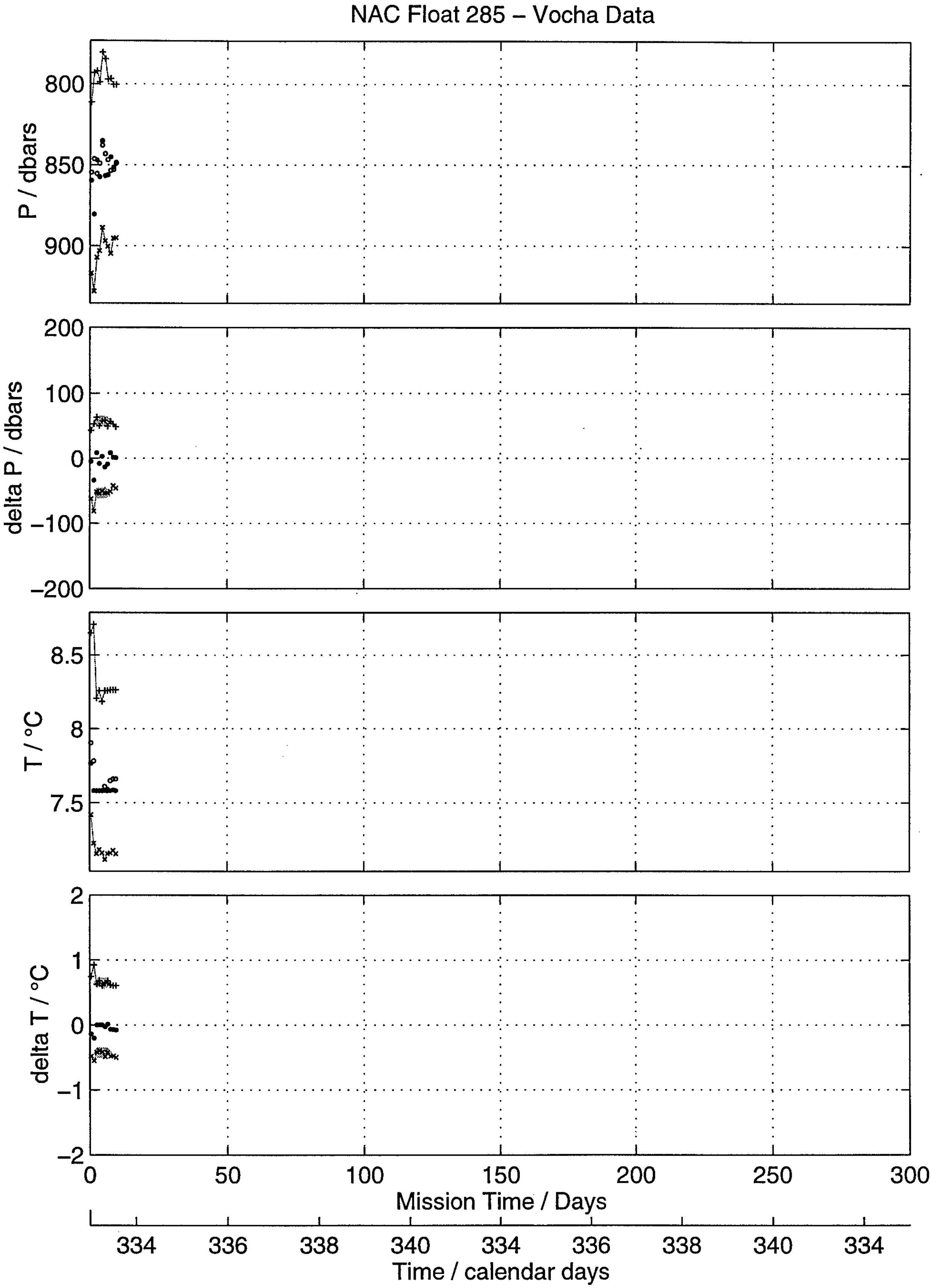


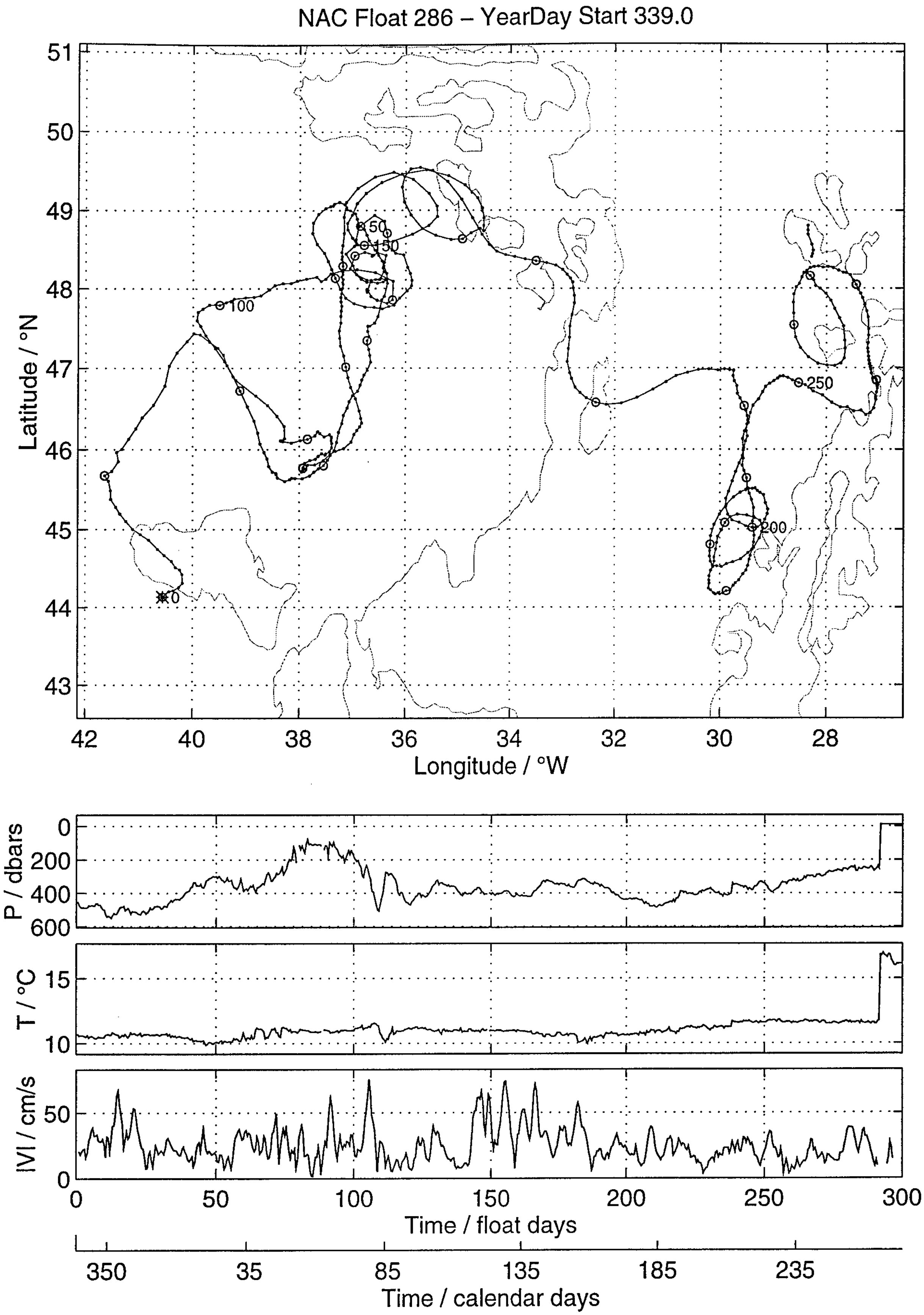
NAC Float 284 – YearDay Start 337.5
Latitude / °N
Longitude / °W
54
52
50
48
46
44
45
40
35
30
25
0
50
100
150
200
250
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days
350
35
85
135
185
235
300

NAC Float 284 – Vocha Data

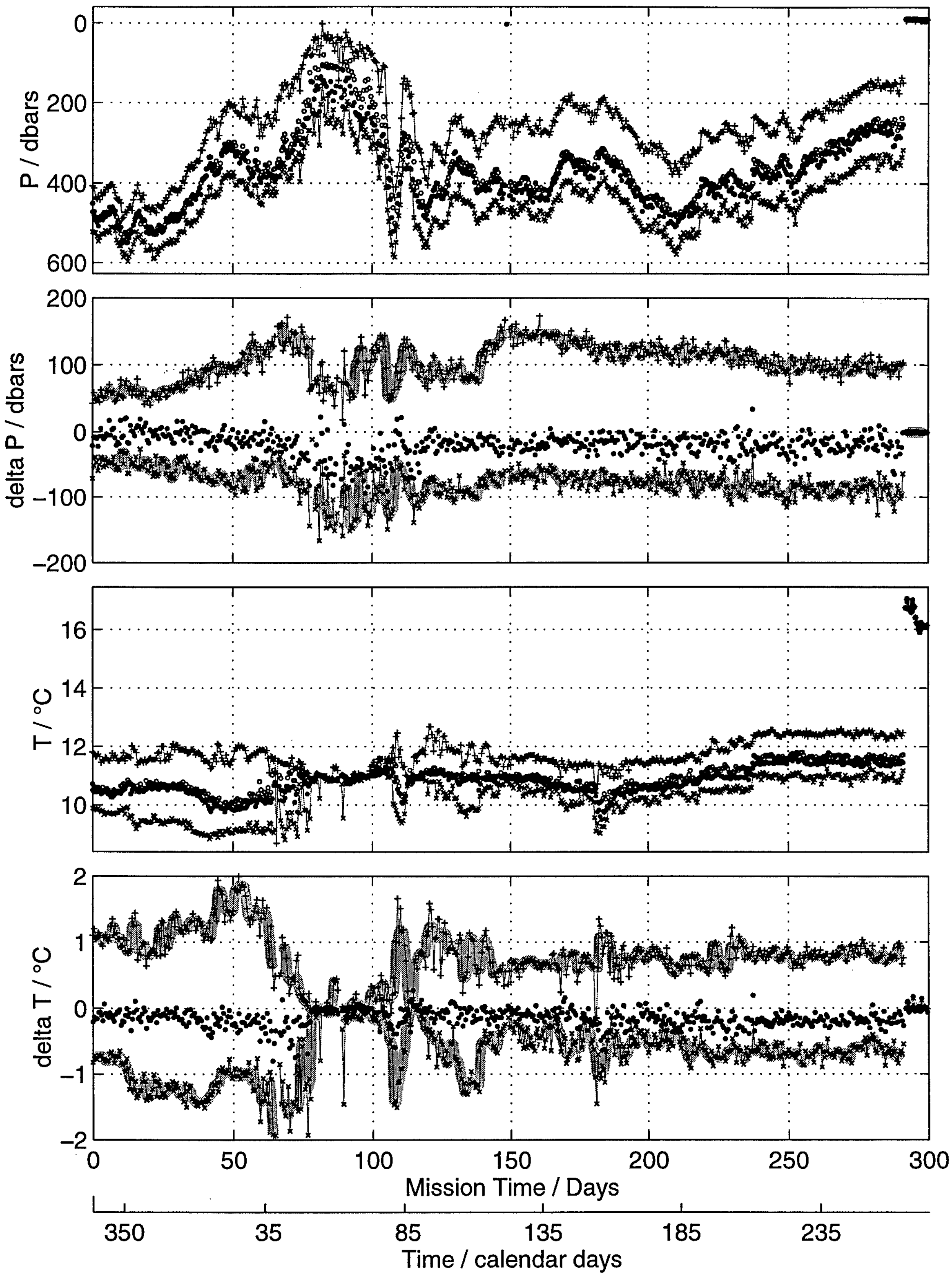


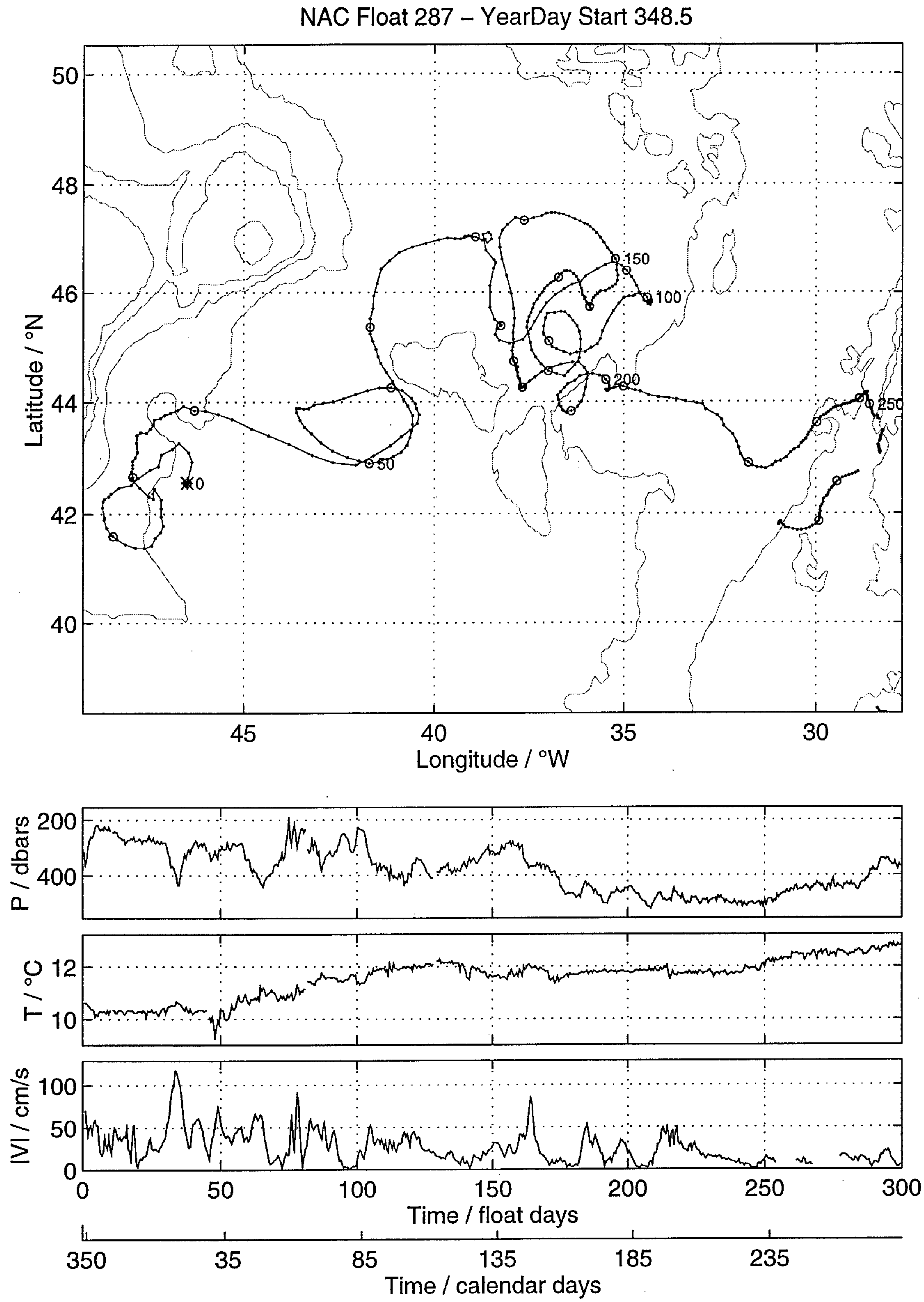

NAC Float 285 – YearDay Start 332.0
Latitude / °N
Longitude / °W
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

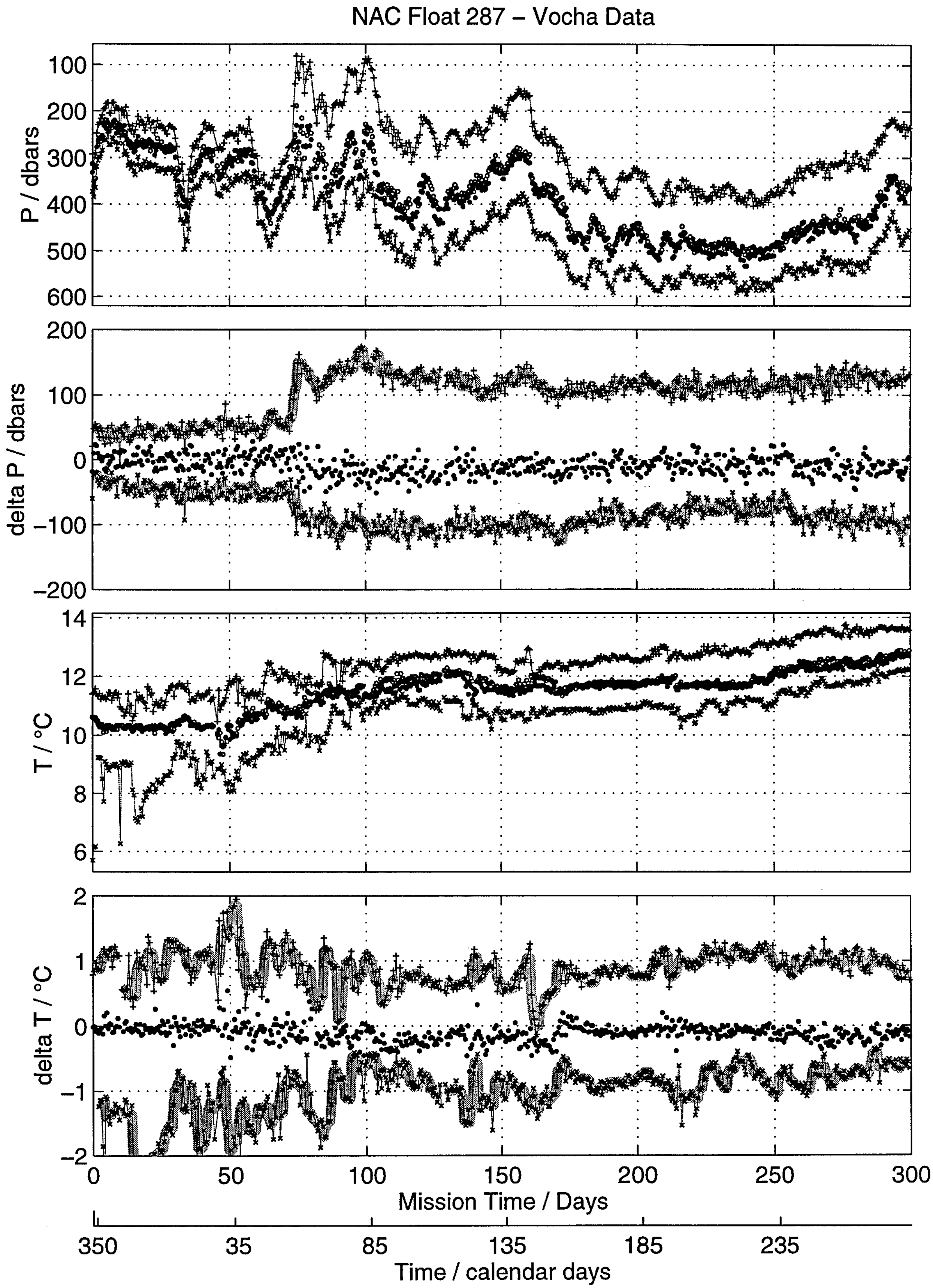

NAC Float 285 – Vocha Data
P / dbars
800
850
900
delta P / dbars
200
100
0
−100
−200
T / °C
8.5
8
7.5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
334
336
338
340
334
336
338
340
334
Time / calendar days


NAC Float 286 – YearDay Start 339.0
Latitude / °N
Longitude / °W
51
50
49
48
47
46
45
44
43
42
40
38
36
34
32
30
28
0
50
100
150
200
250
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days
350
35
85
135
185
235
300

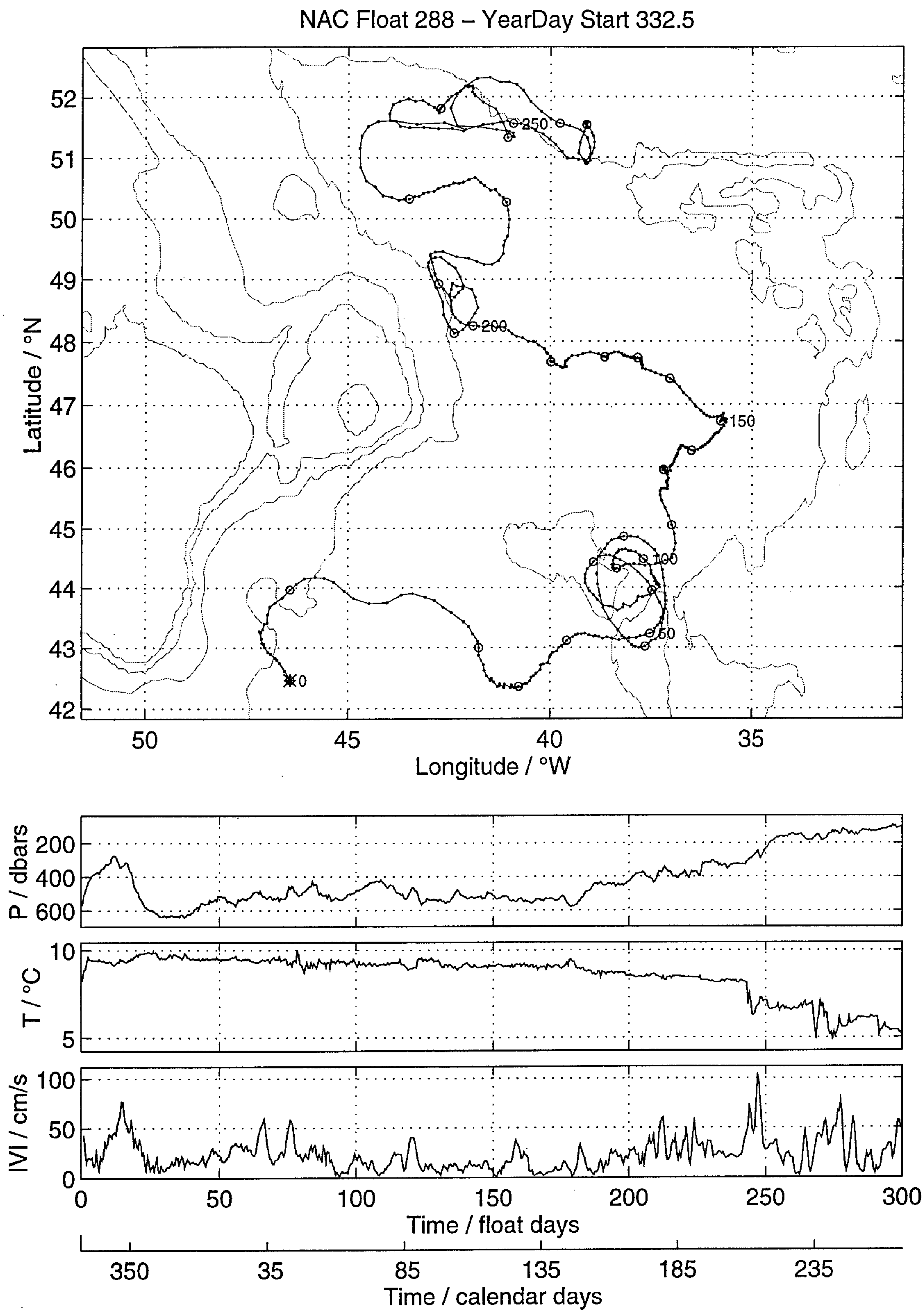
NAC Float 286 – Vocha Data



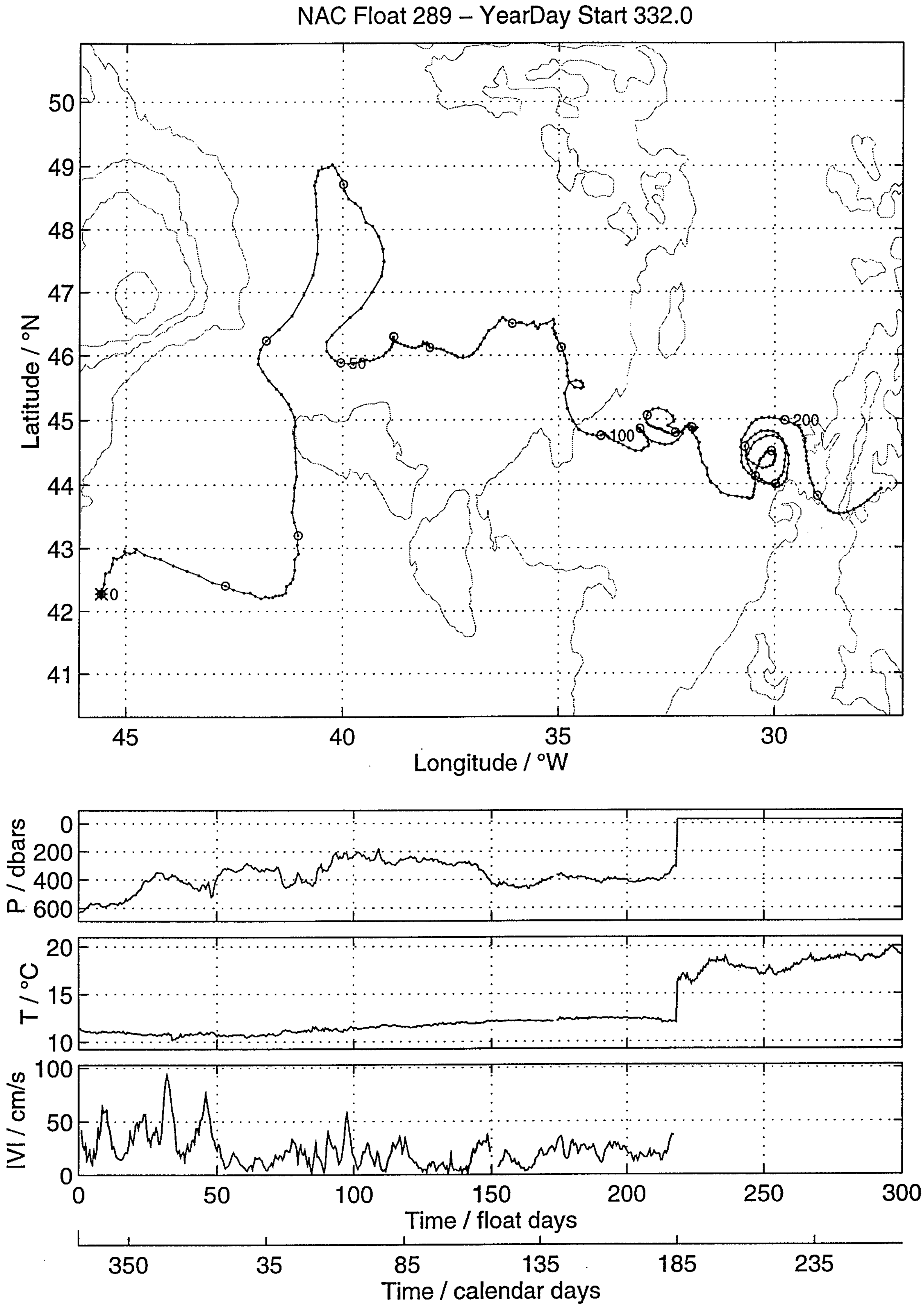

NAC Float 287 – YearDay Start 348.5
Latitude / °N
Longitude / °W
50
48
46
44
42
40
45
40
35
30
0
50
100
150
200
250
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days
350
35
85
135
185
235
300

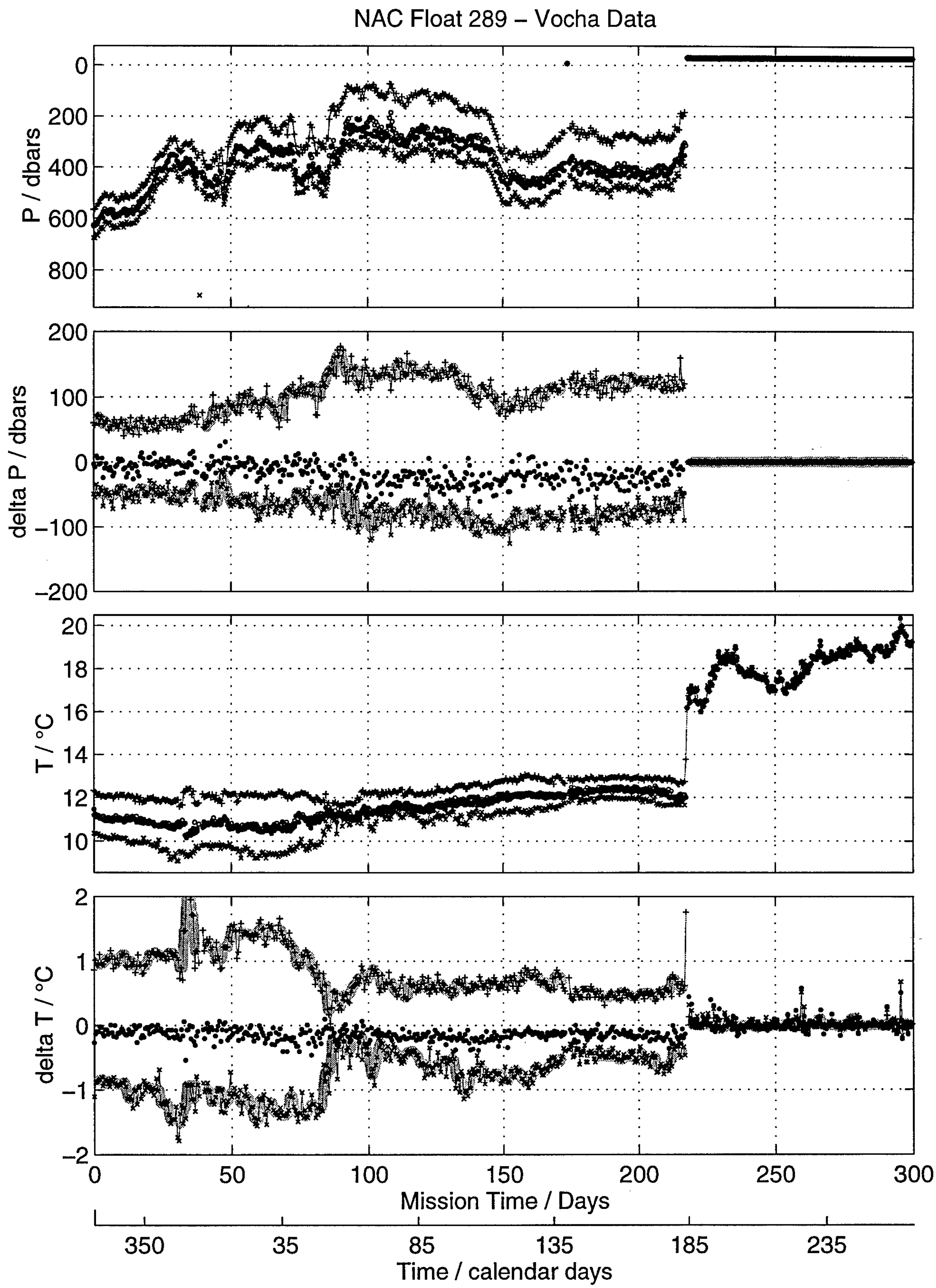


NAC Float 287 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days

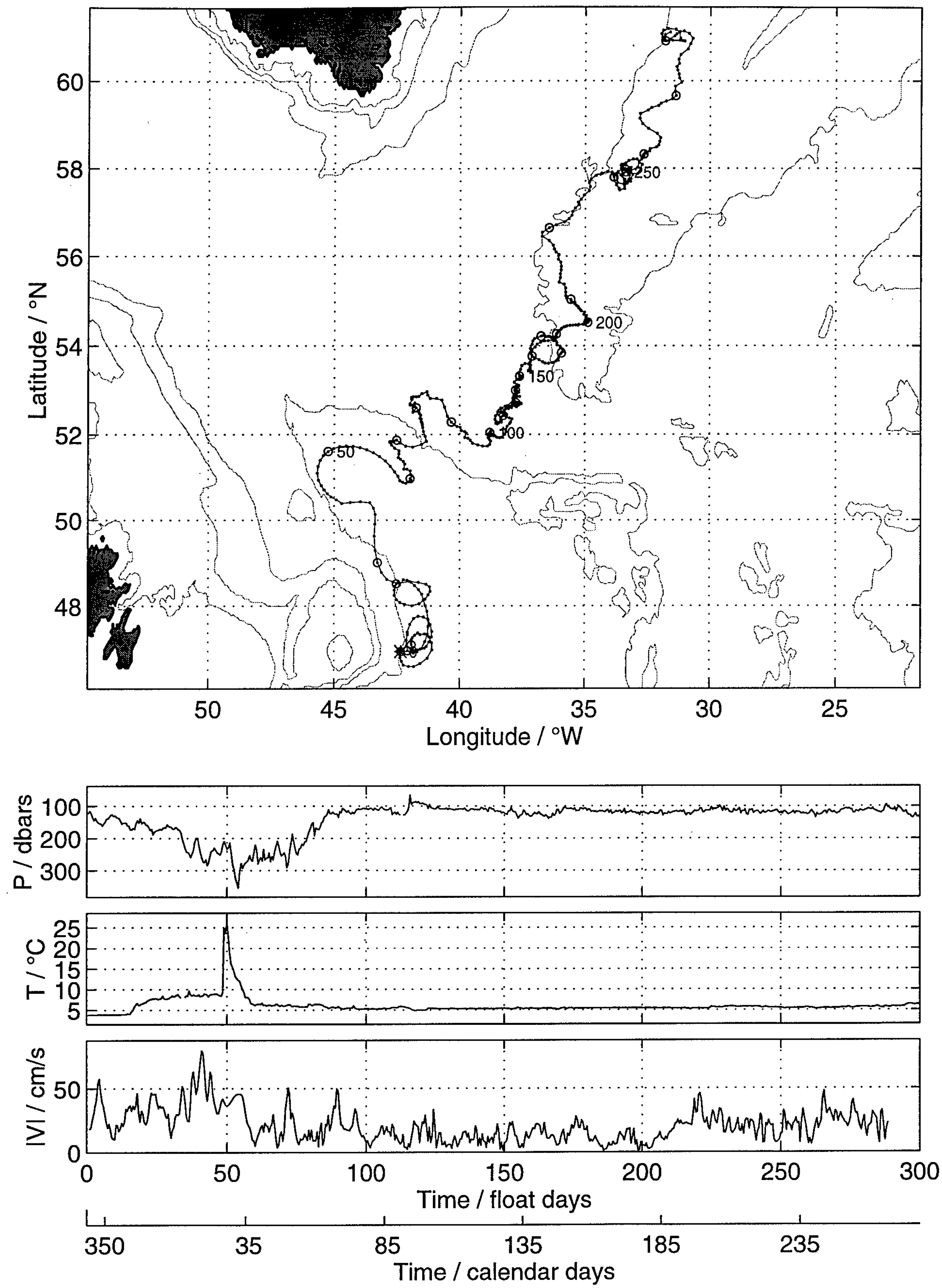

NAC Float 288 – YearDay Start 332.5
Latitude / °N
Longitude / °W
52
51
50
49
48
47
46
45
44
43
42
50
45
40
35
250
200
150
100
50
0
P / dbars
200
400
600
T / °C
10
5
|V| / cm/s
100
50
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days

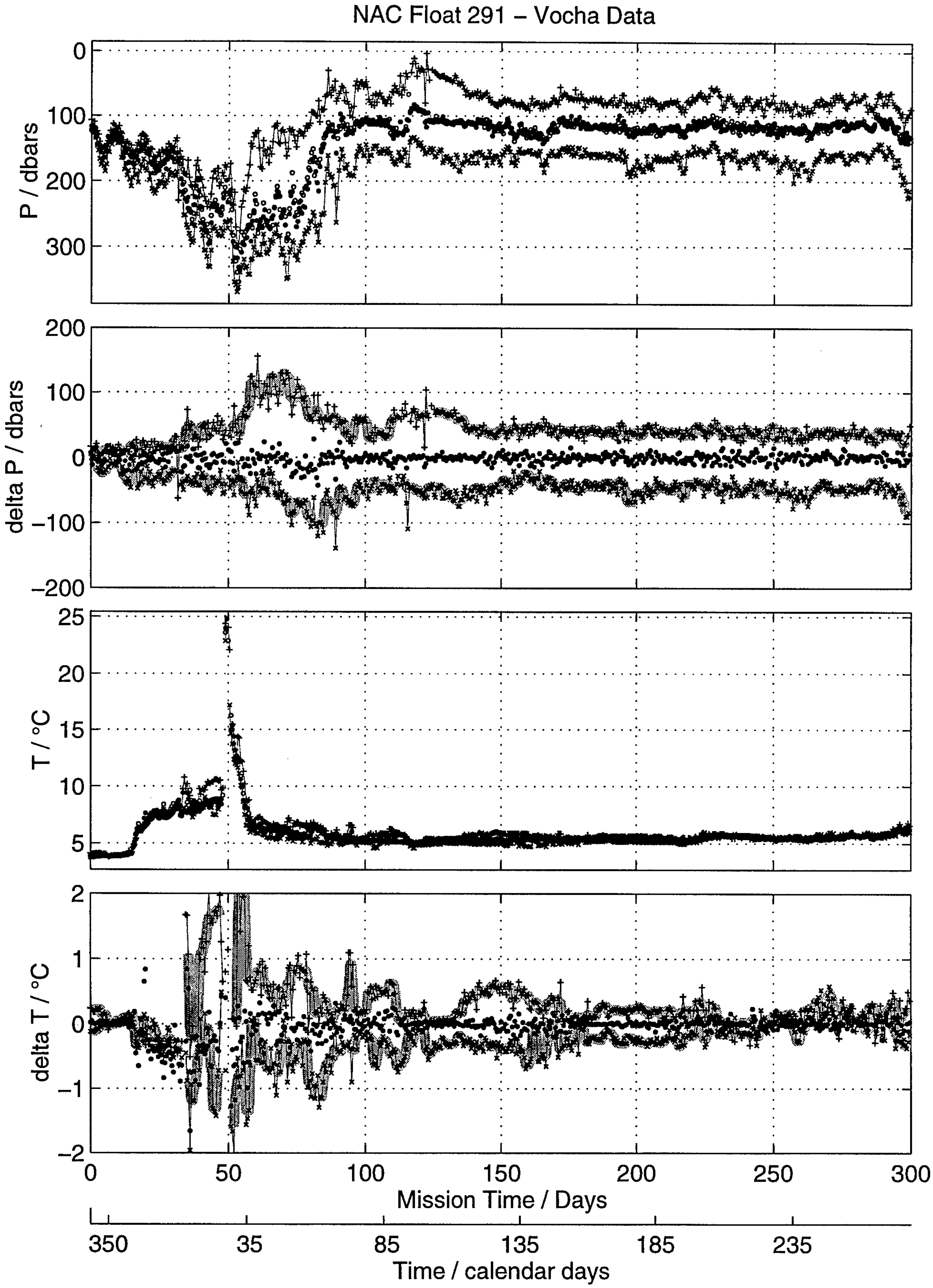
NO VOCHA DATA

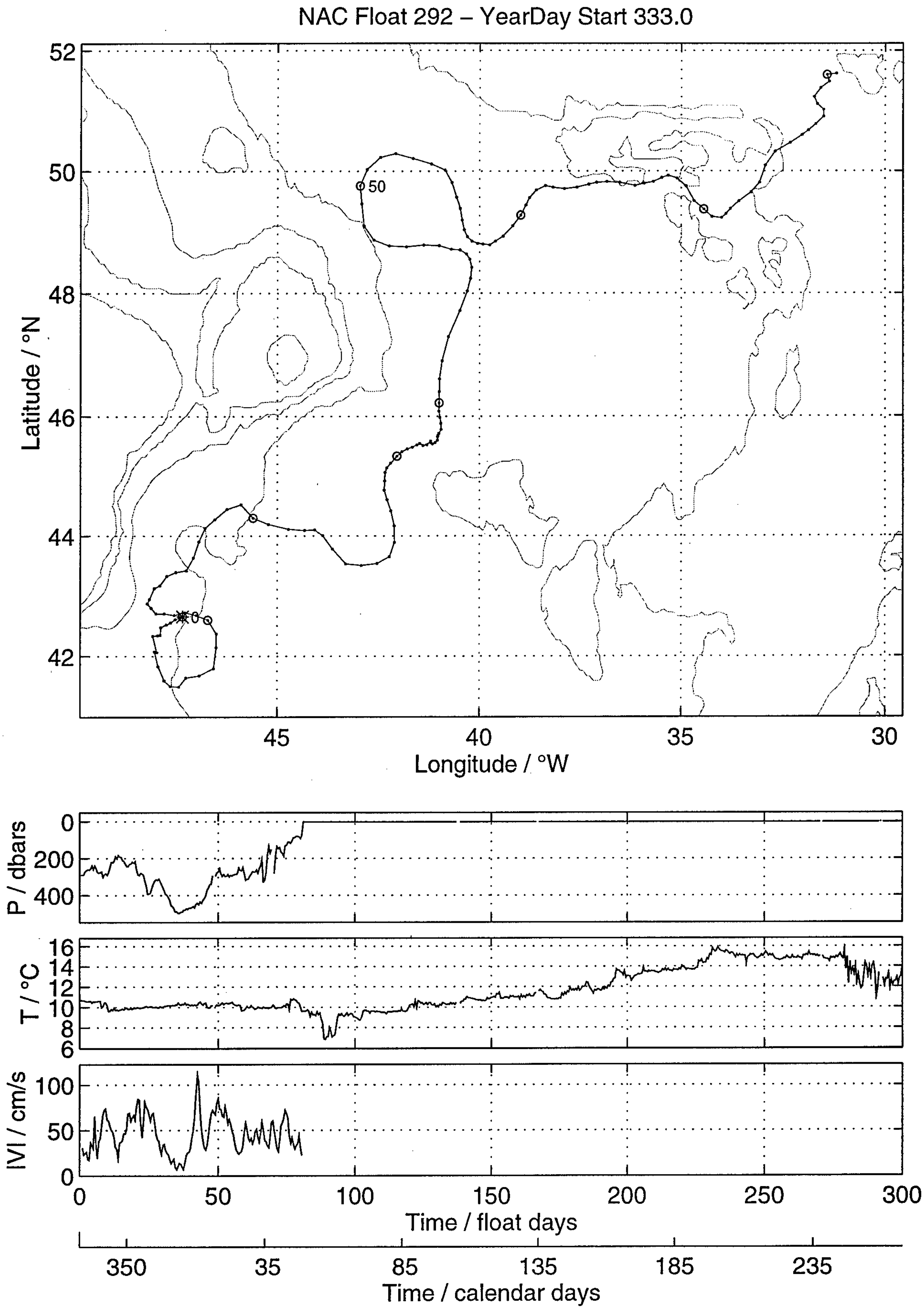

NAC Float 289 – YearDay Start 332.0
Latitude / °N
Longitude / °W
50
100
200
0
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

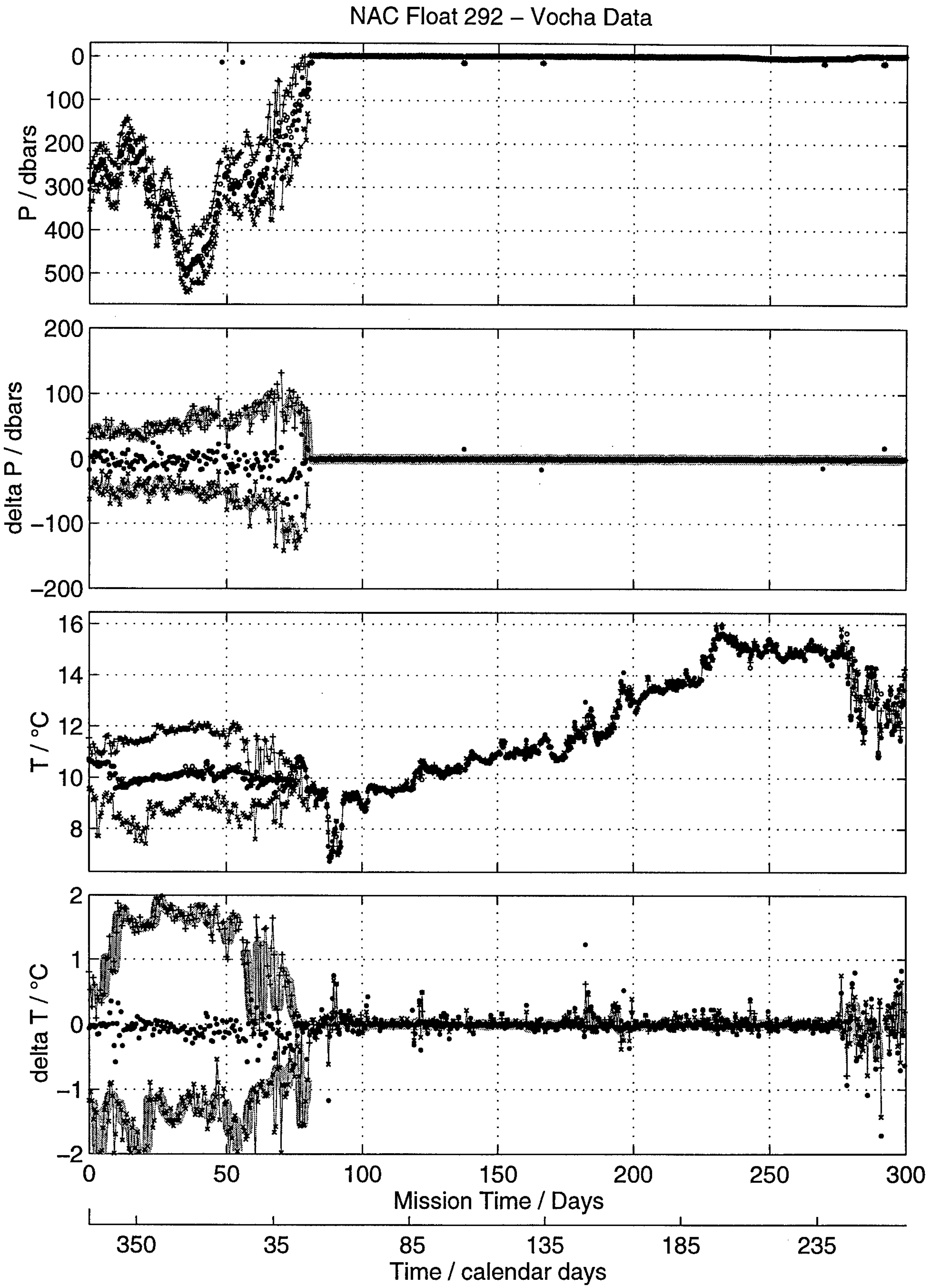

NAC Float 289 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days

NAC Float 291 – YearDay Start 343.5

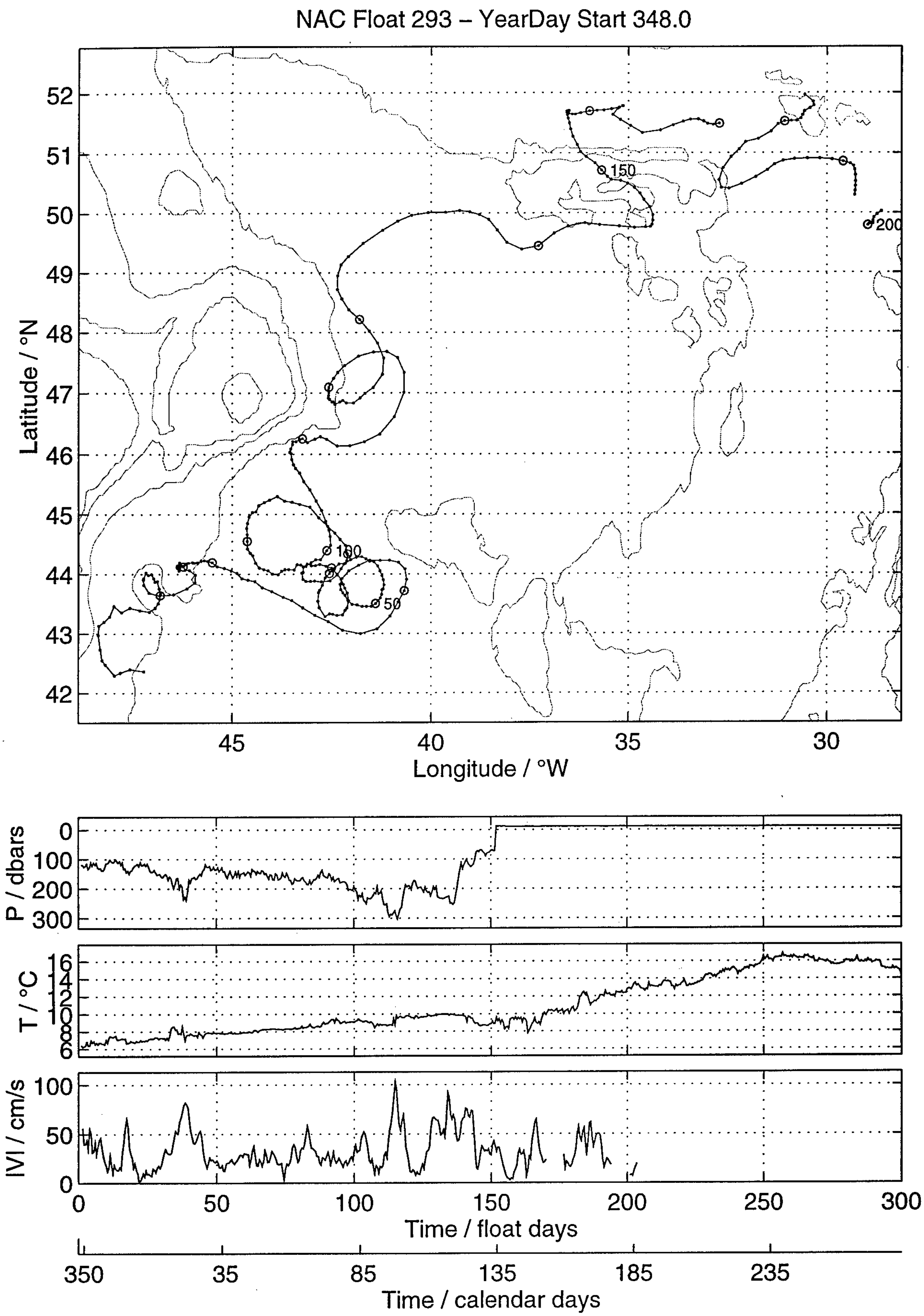



NAC Float 291 – Vocha Data
P / dbars
0
100
200
300
delta P / dbars
200
100
0
−100
−200
T / °C
25
20
15
10
5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

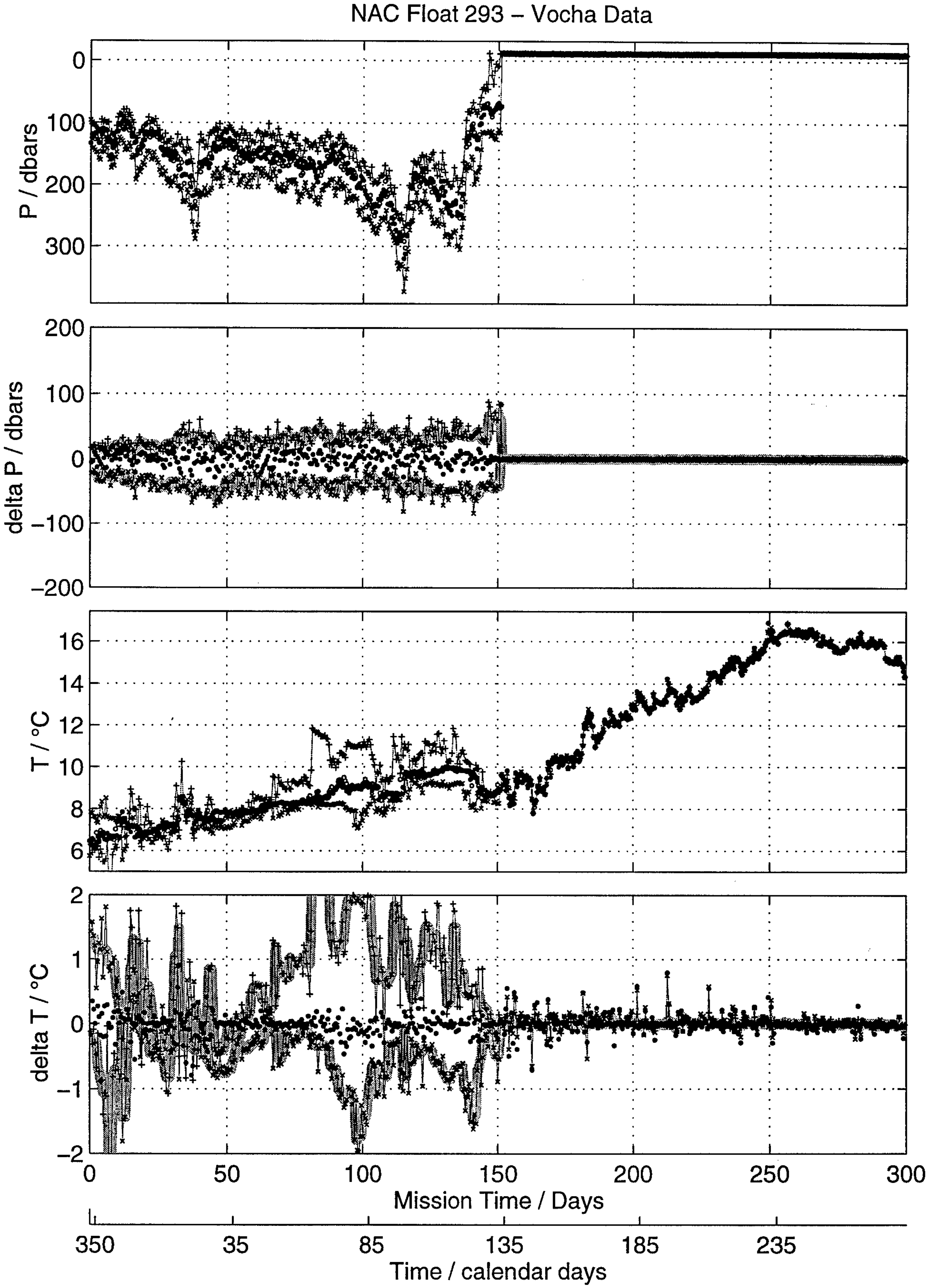

NAC Float 292 – YearDay Start 333.0
Latitude / °N
Longitude / °W
50
52
50
48
46
44
42
45
40
35
30
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days
0
50
100
150
200
250
300
350
35
85
135
185
235

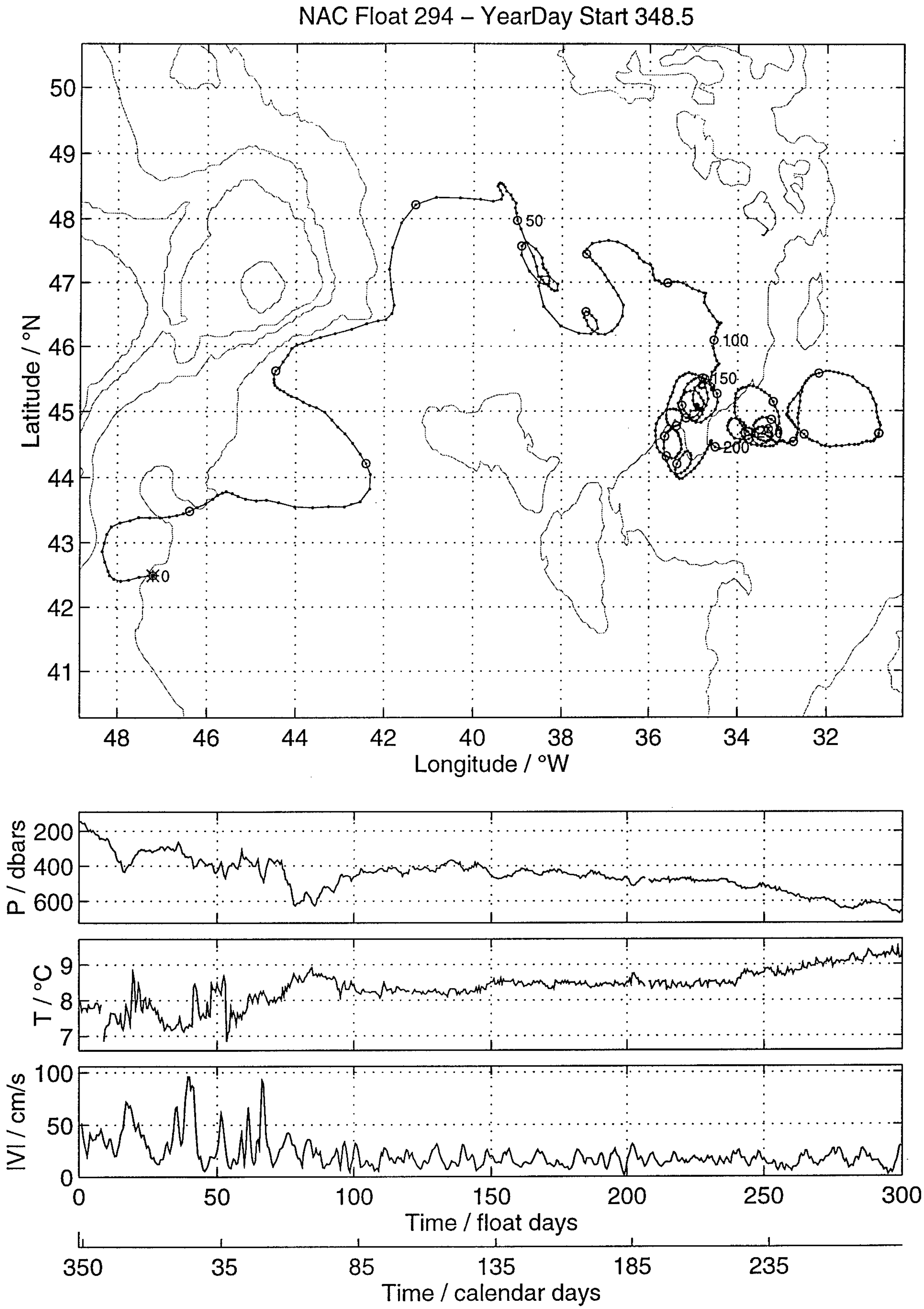


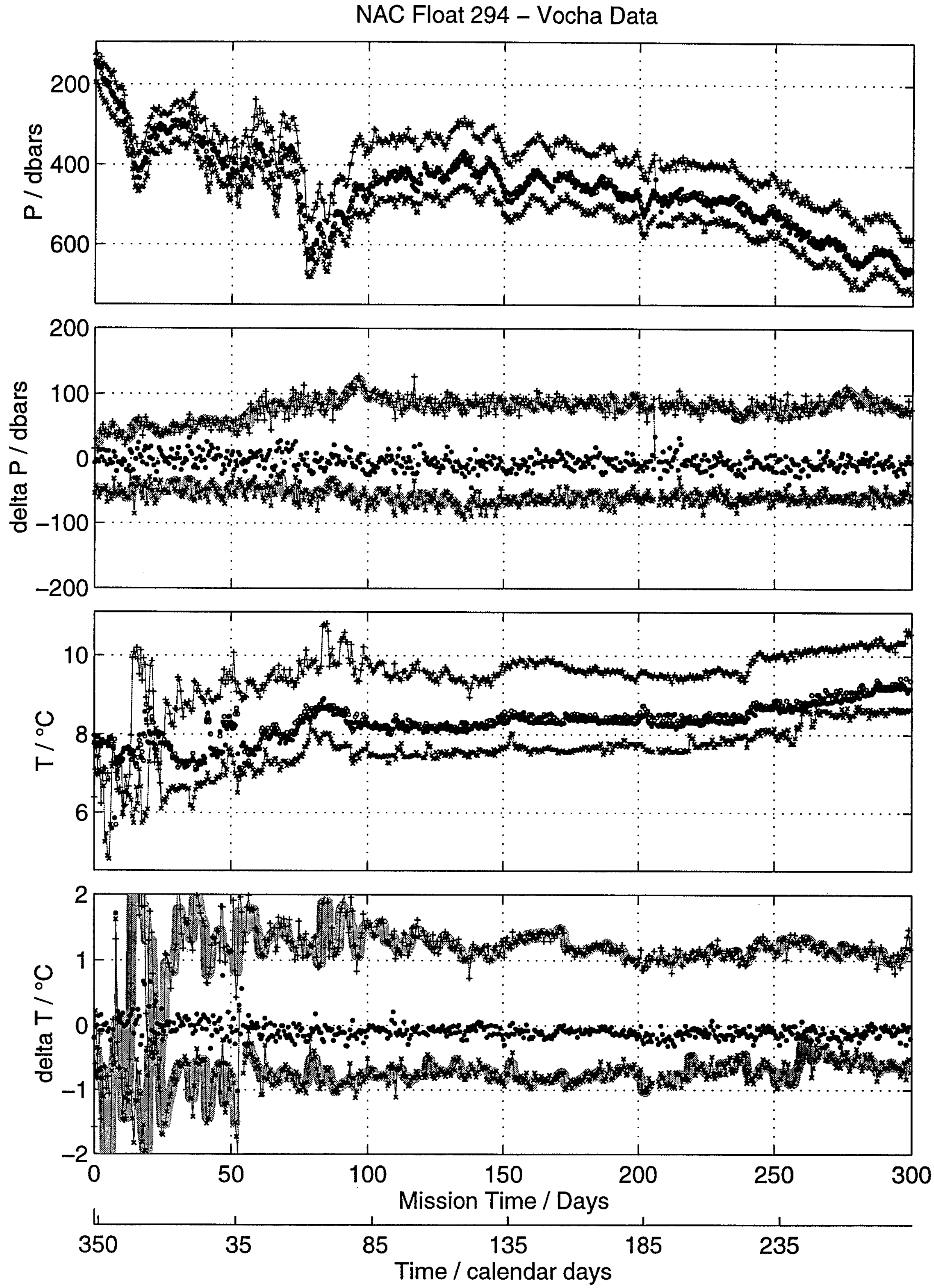
NAC Float 292 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days

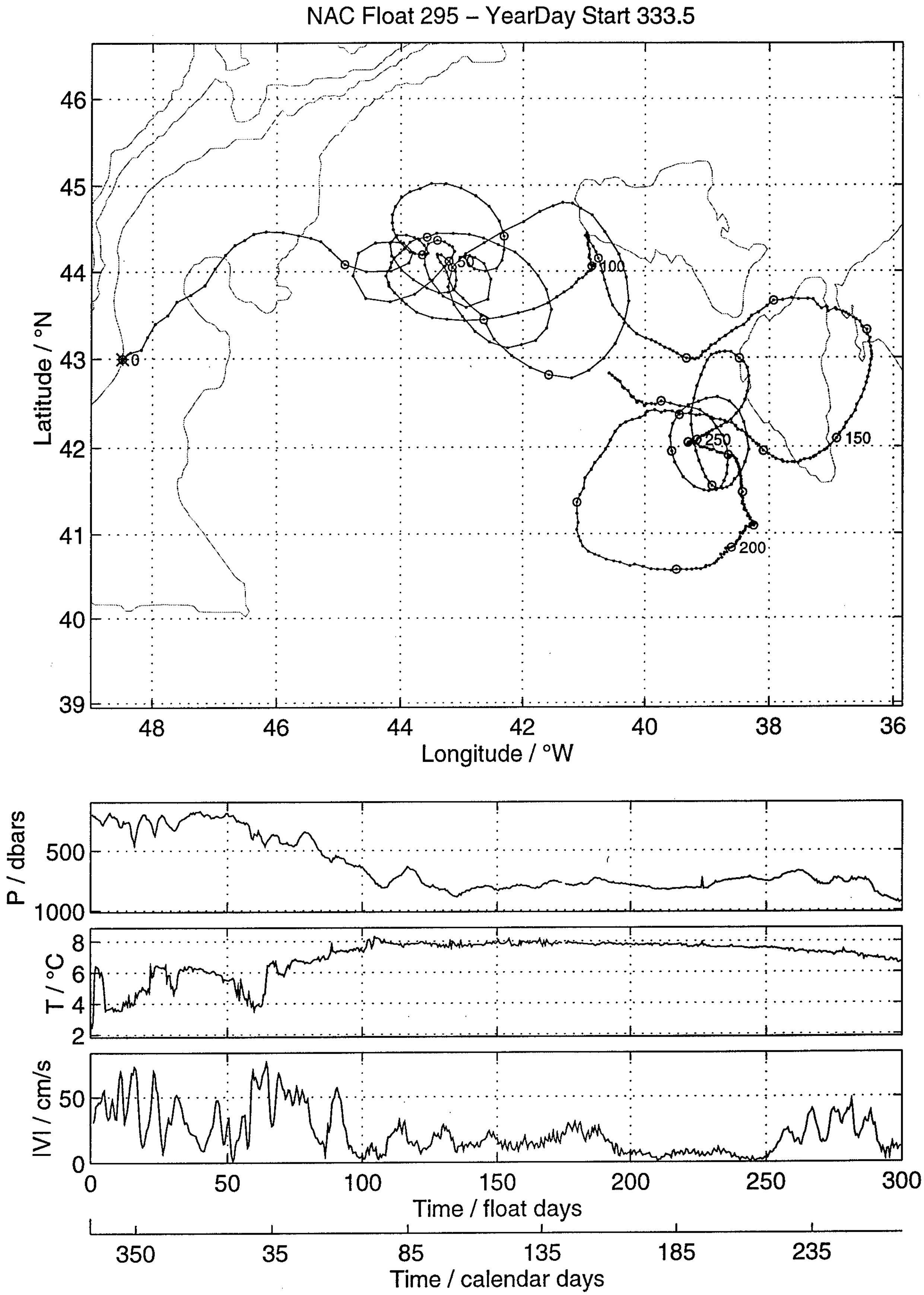


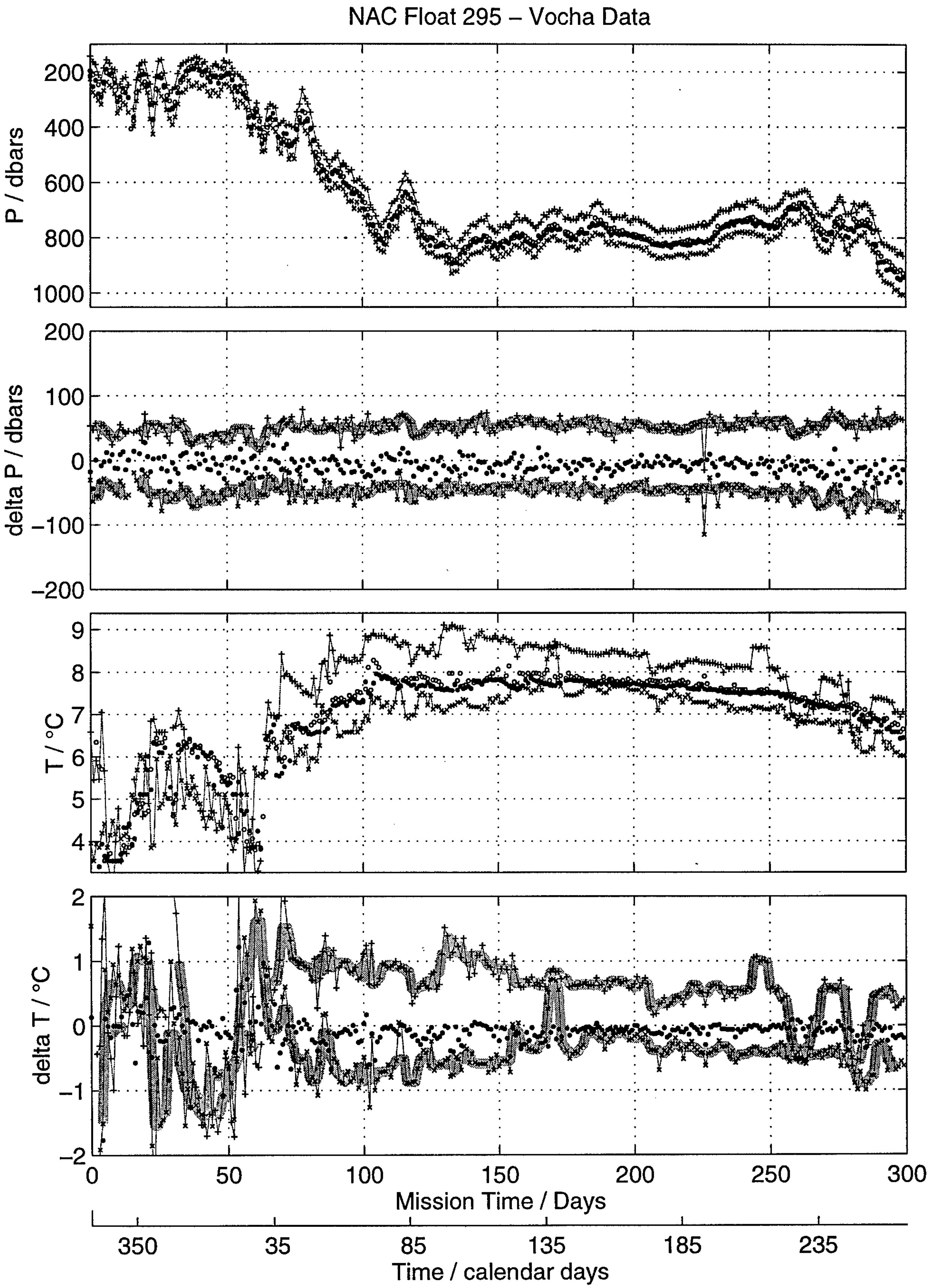
NAC Float 293 – YearDay Start 348.0
Latitude / °N
Longitude / °W
52
51
50
49
48
47
46
45
44
43
42
45
40
35
30
150
200
100
50
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days
0
50
100
150
200
250
300
350
35
85
135
185
235


NAC Float 293 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days
0
100
200
300
−100
−200
16
14
12
10
8
6
2
1
−1
−2
50
150
250
350
35
85
135
185
235

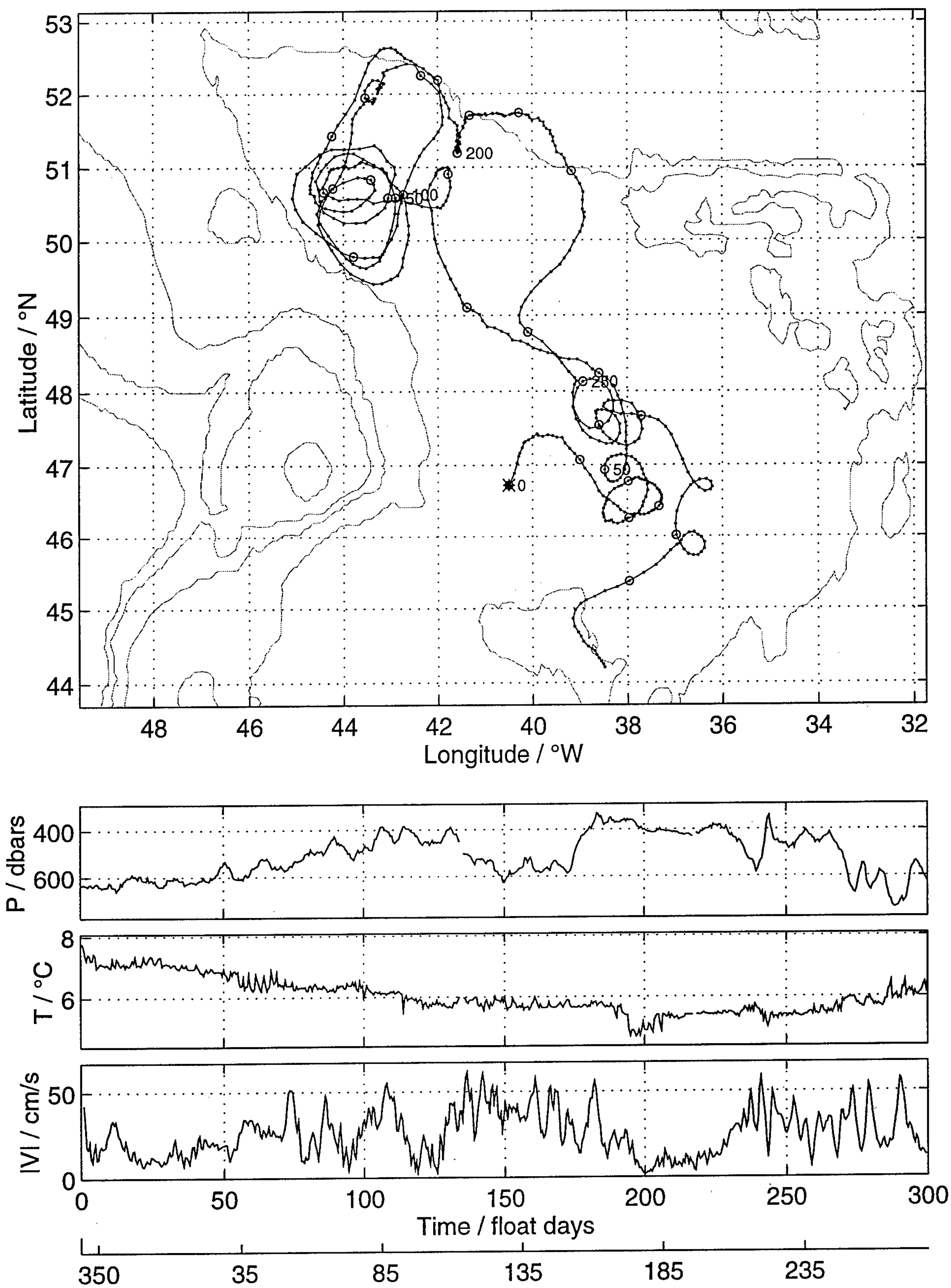

NAC Float 294 – YearDay Start 348.5
Latitude / °N
Longitude / °W
50
49
48
47
46
45
44
43
42
41
48
46
44
42
40
38
36
34
32
0
50
100
150
200
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days
350
35
85
135
185
235
0
50
100
150
200
250
300

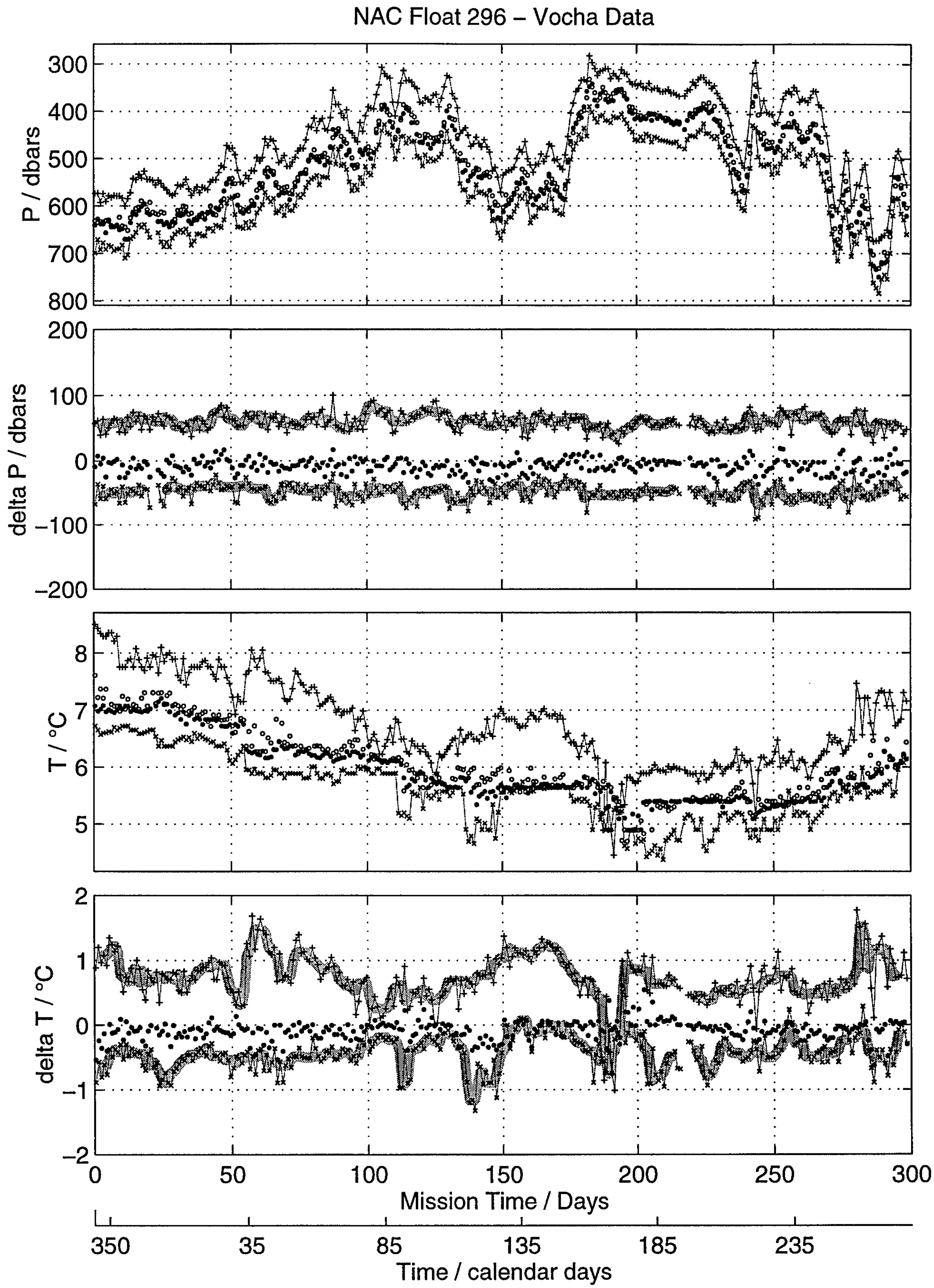

NAC Float 294 – Vocha Data
P / dbars
200
400
600
delta P / dbars
200
100
0
−100
−200
T / °C
10
8
6
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

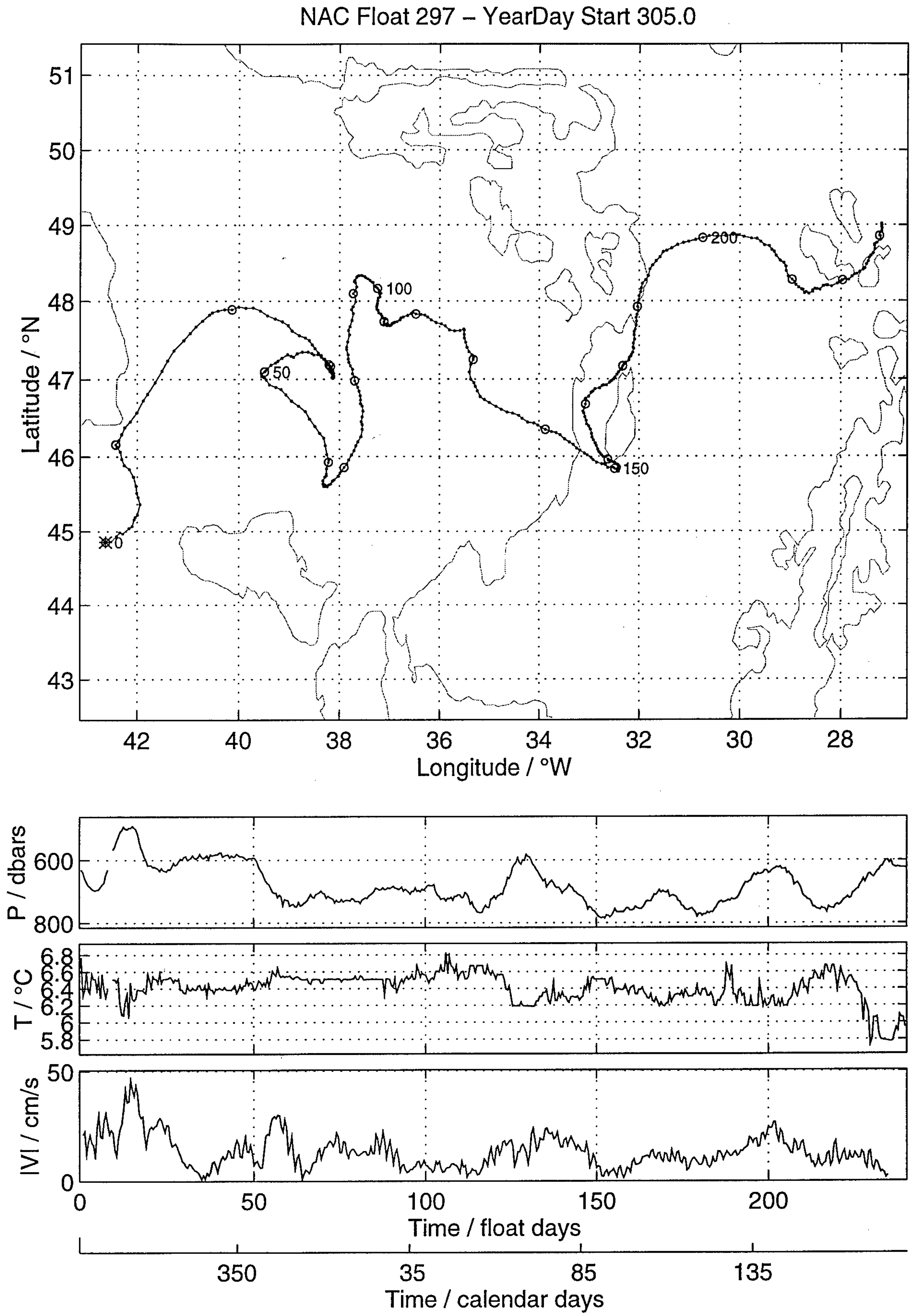

NAC Float 295 – YearDay Start 333.5
Latitude / °N
Longitude / °W
46
45
44
43
42
41
40
39
48
46
44
42
40
38
36
0
50
100
150
200
250
P / dbars
500
1000
T / °C
8
6
4
2
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days


NAC Float 295 – Vocha Data
P / dbars
200
400
600
800
1000
delta P / dbars
200
100
0
−100
−200
T / °C
9
8
7
6
5
4
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

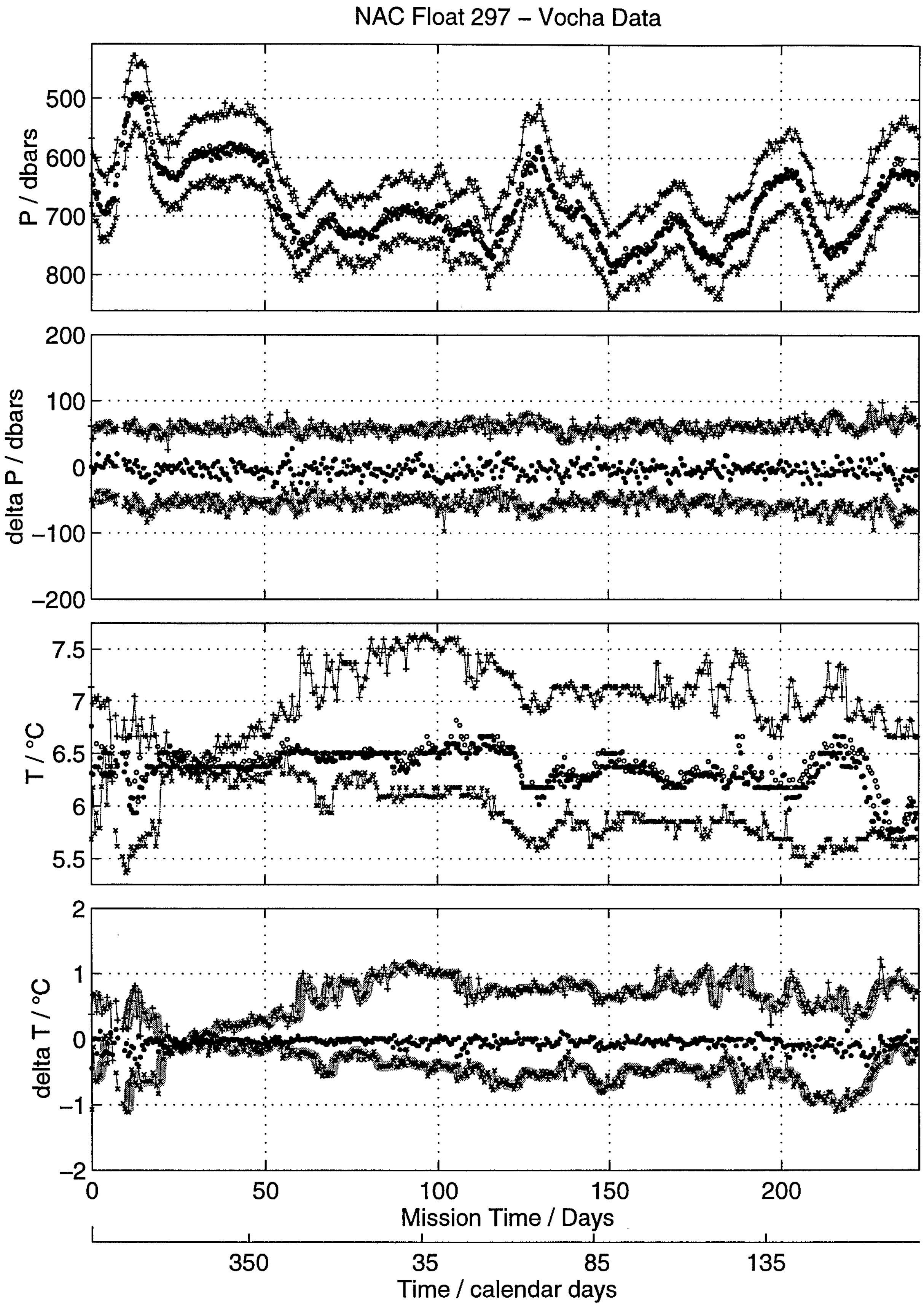
NAC Float 296 – YearDay Start 344.0

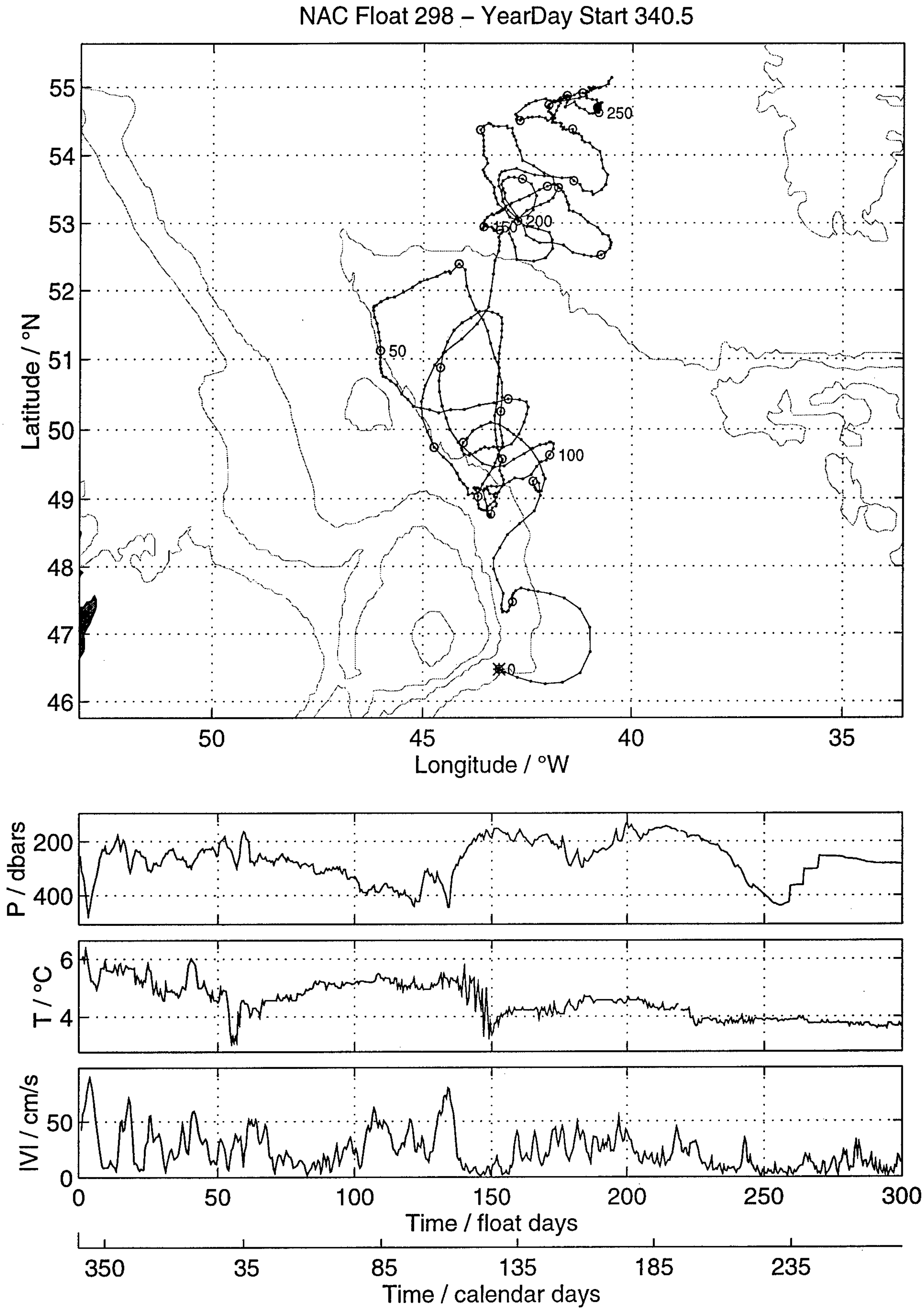


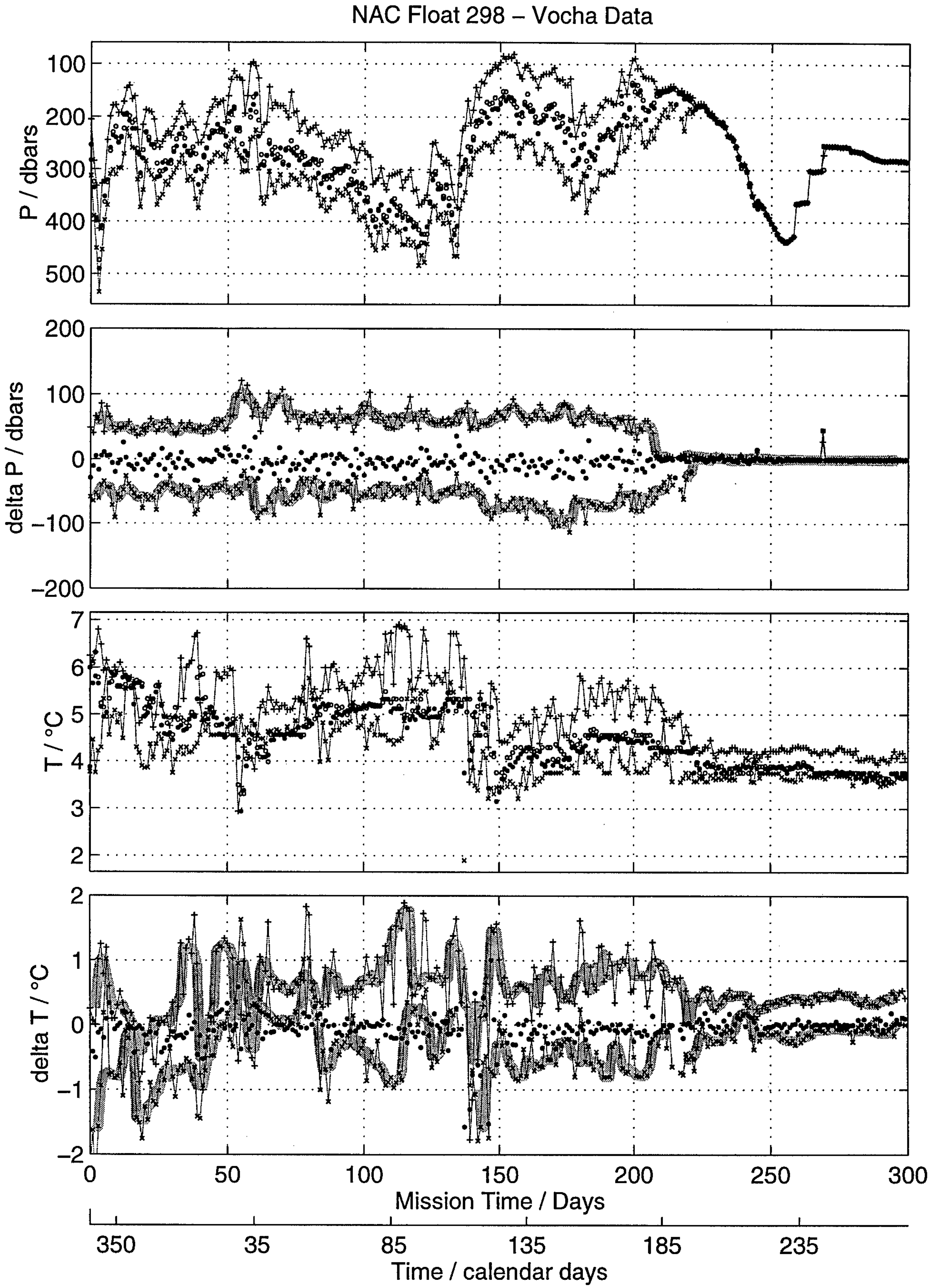

NAC Float 296 – Vocha Data
P / dbars
300
400
500
600
700
800
delta P / dbars
200
100
0
−100
−200
T / °C
8
7
6
5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days



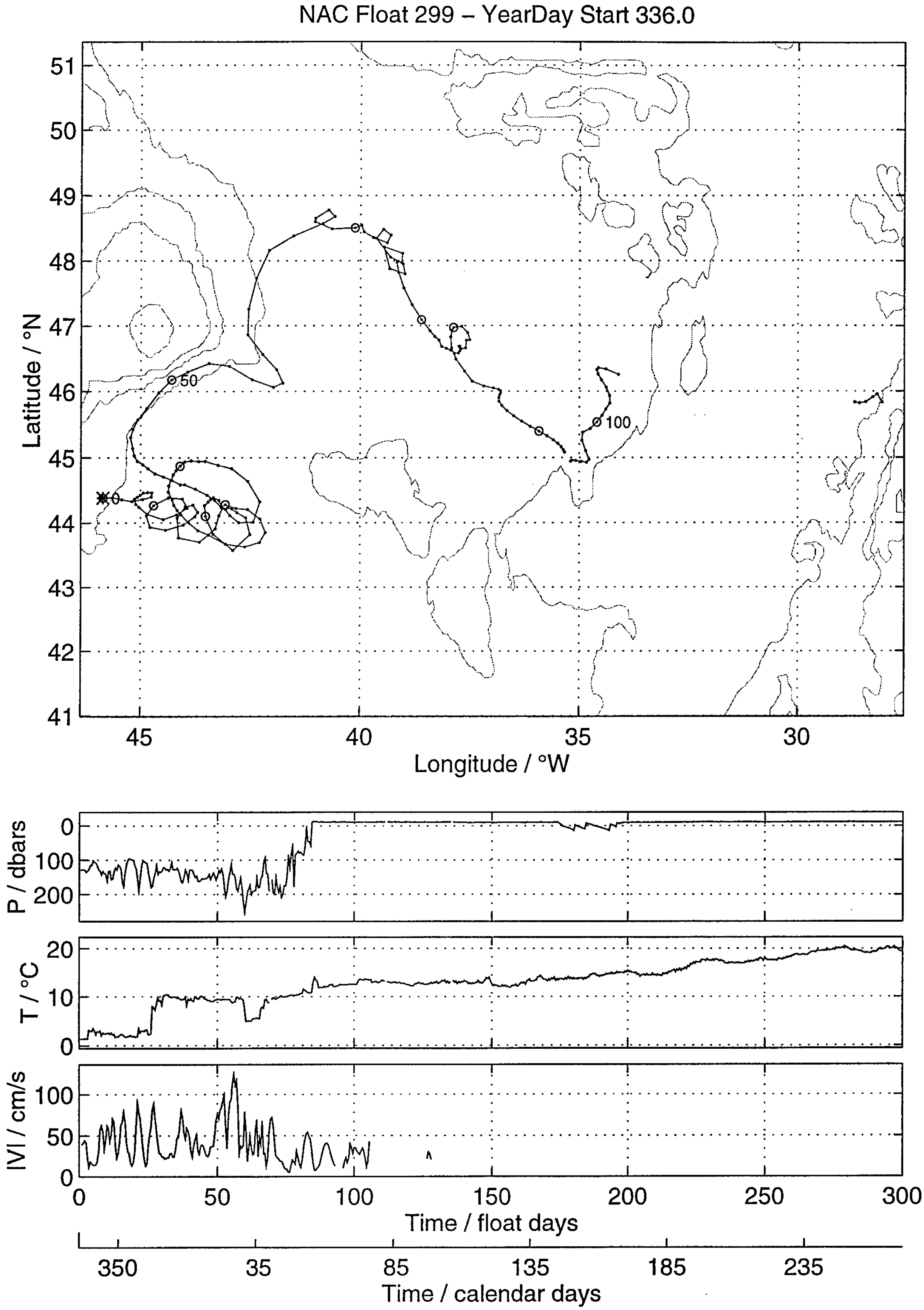
NAC Float 297 – YearDay Start 305.0
Latitude / °N
Longitude / °W
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

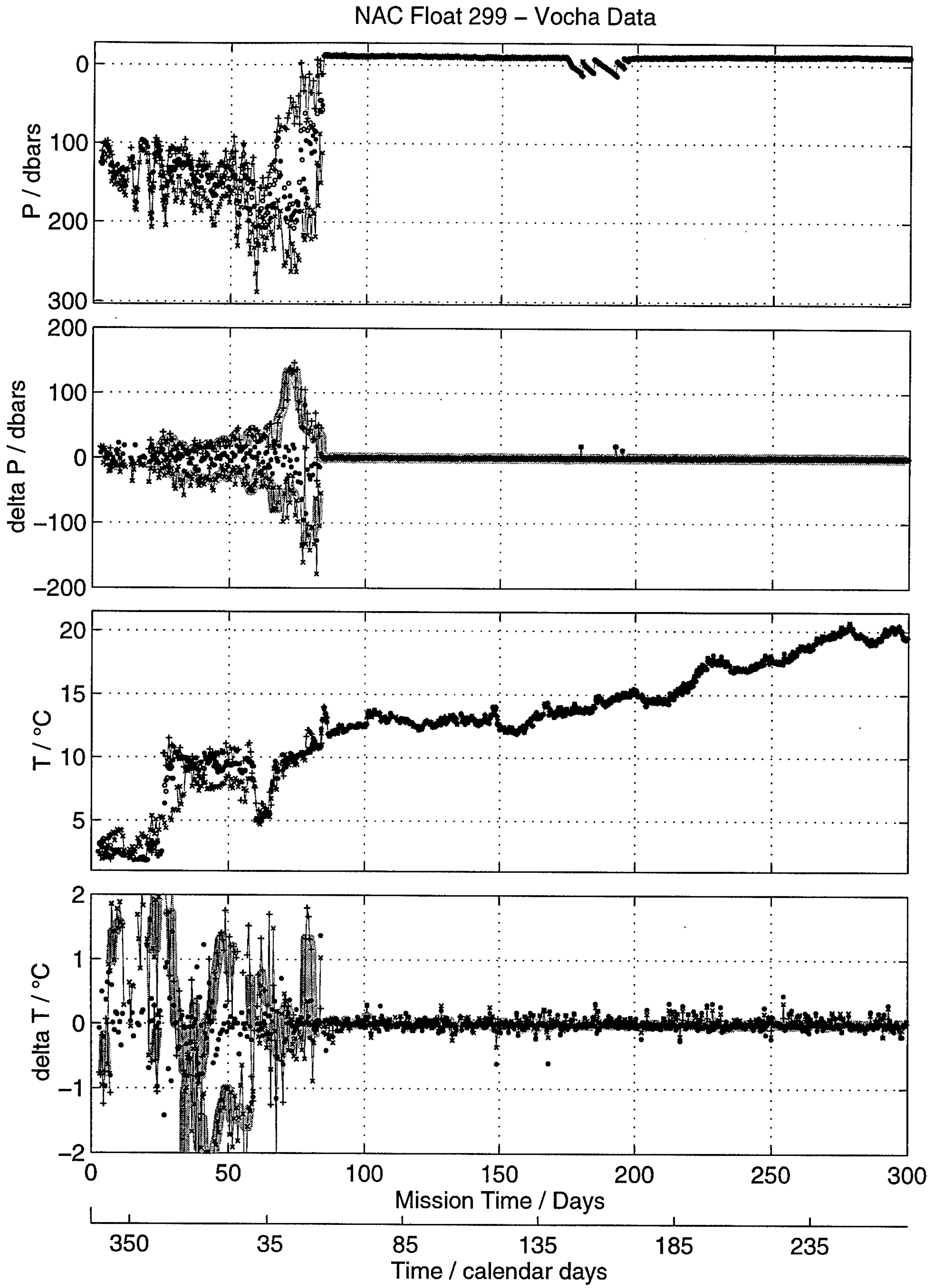

NAC Float 297 – Vocha Data
P / dbars
500
600
700
800
delta P / dbars
200
100
0
−100
−200
T / °C
7.5
7
6.5
6
5.5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days


NAC Float 298 – YearDay Start 340.5
Latitude / °N
Longitude / °W
55
54
53
52
51
50
49
48
47
46
50
45
40
35
250
200
150
100
50
0
P / dbars
200
400
T / °C
6
4
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days

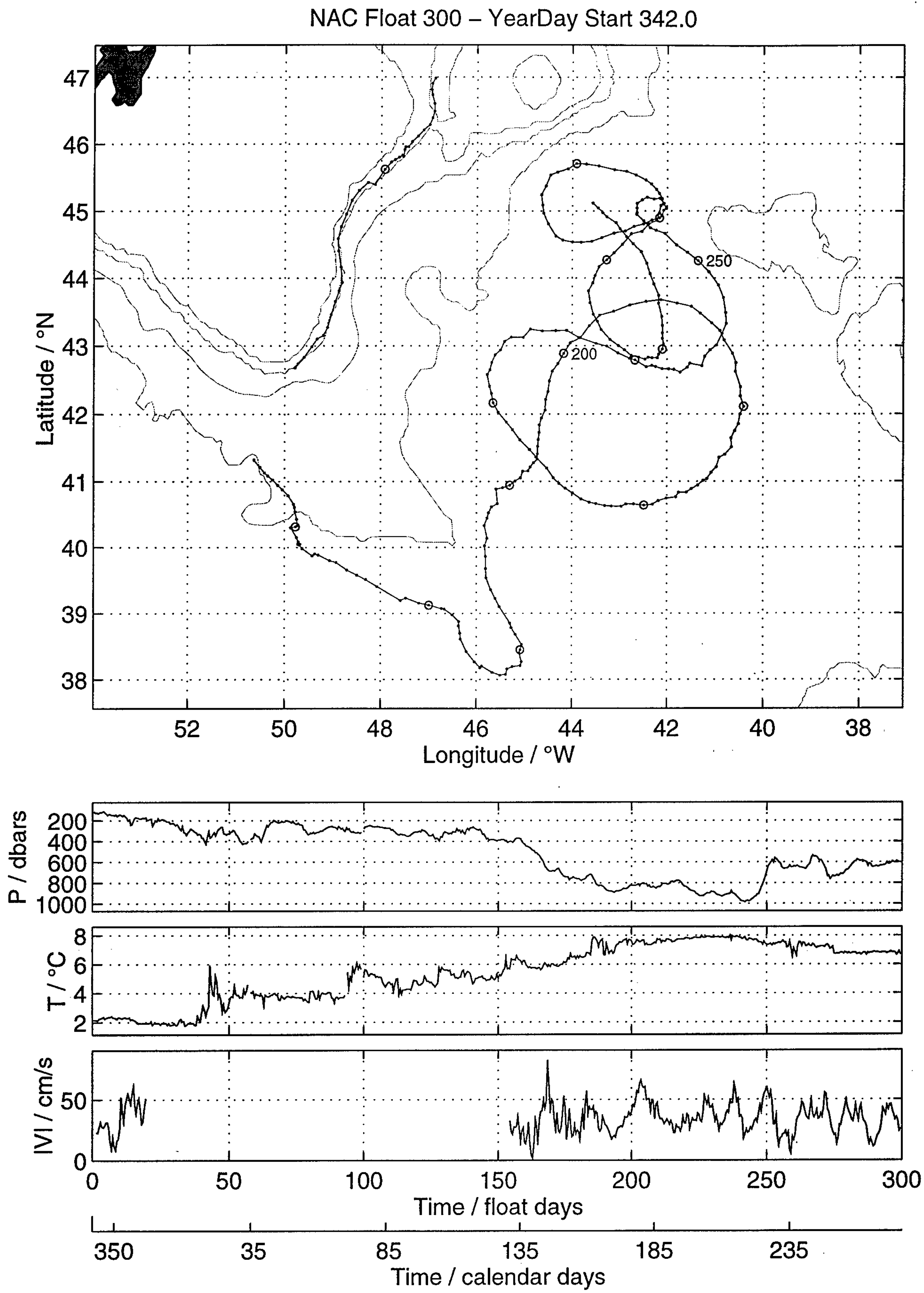


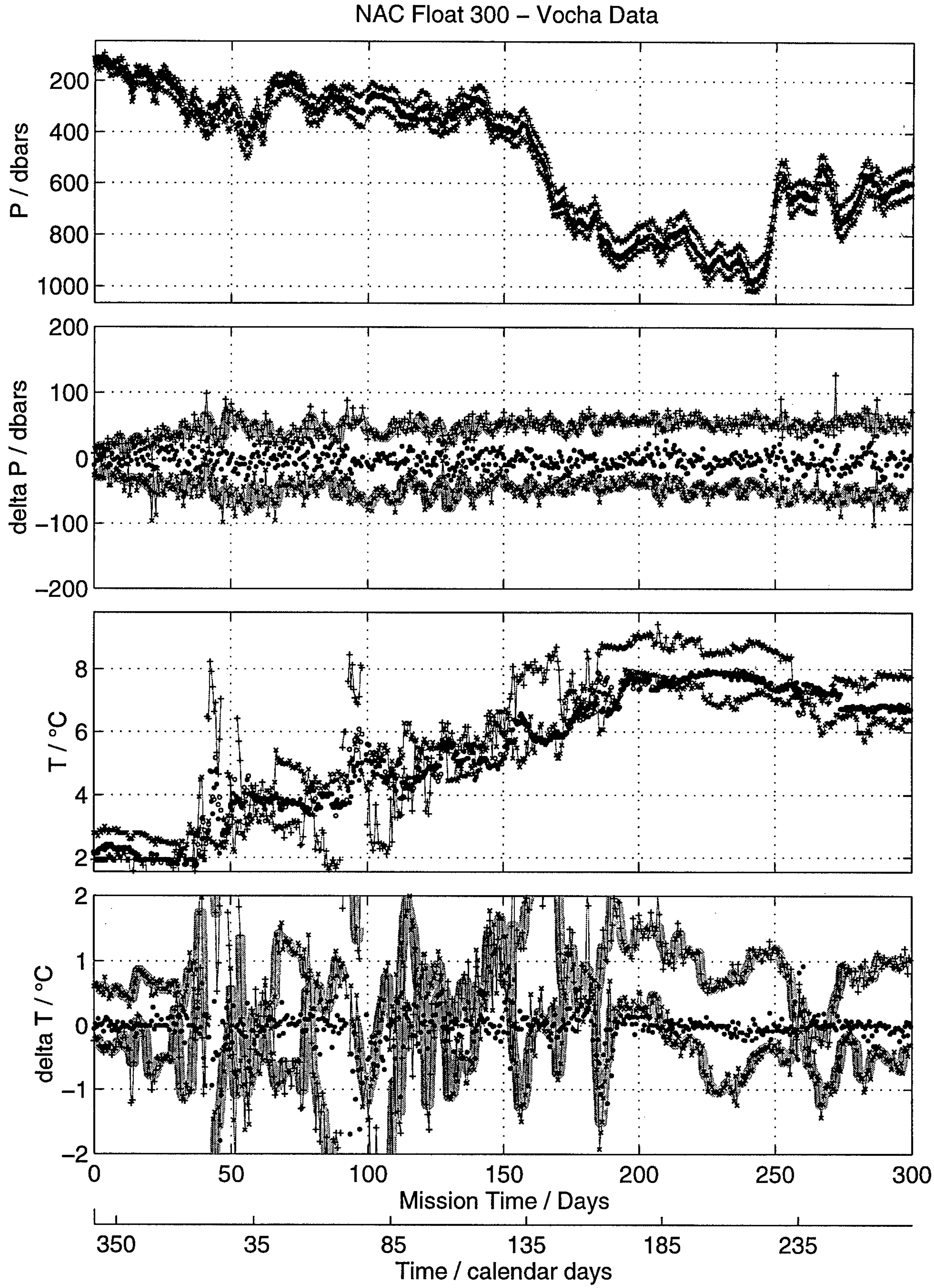
NAC Float 298 – Vocha Data
P / dbars
100
200
300
400
500
delta P / dbars
200
100
0
−100
−200
T / °C
7
6
5
4
3
2
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

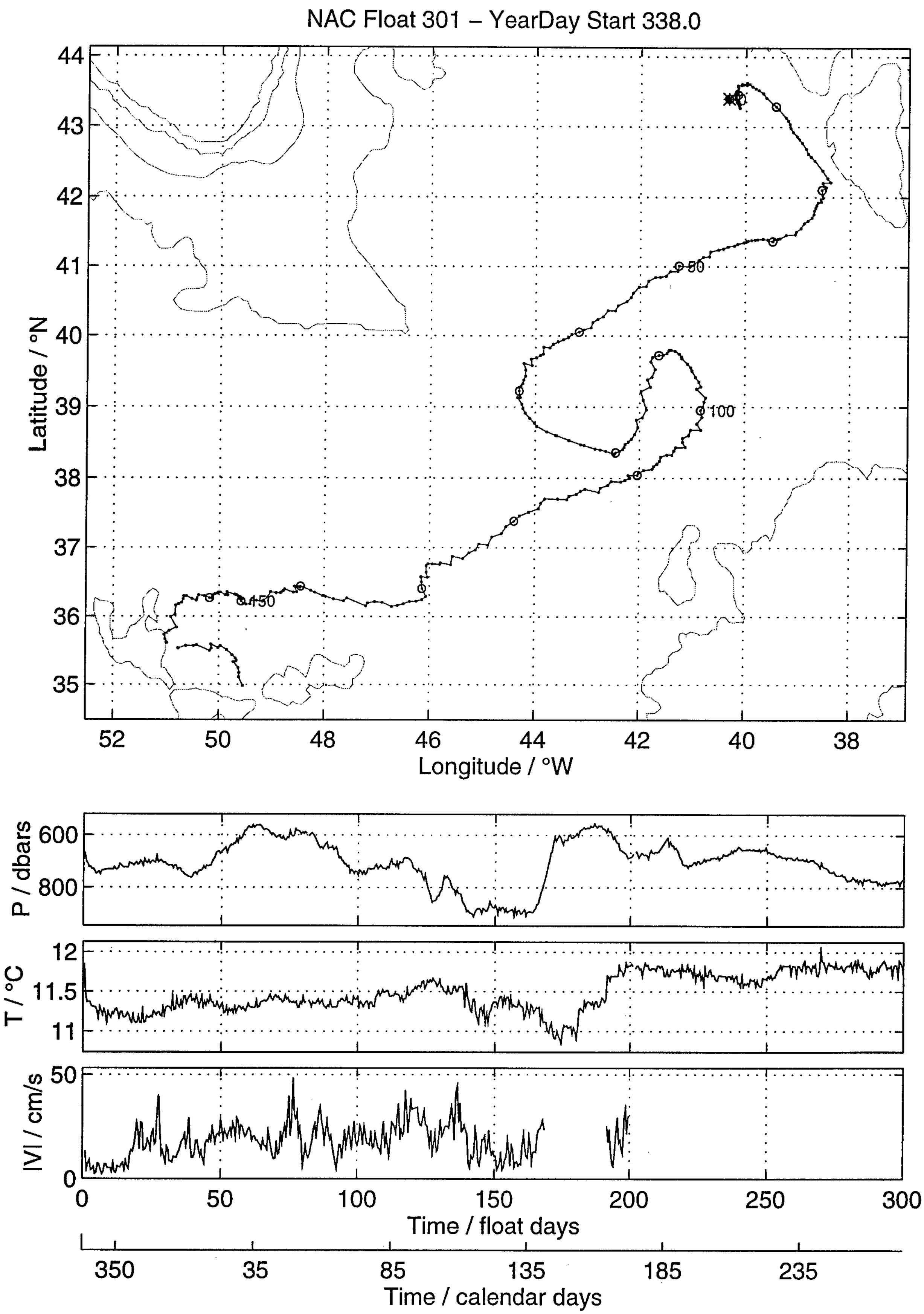

NAC Float 299 – YearDay Start 336.0
Latitude / °N
Longitude / °W
51
50
49
48
47
46
45
44
43
42
41
45
40
35
30
0
50
100
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days
0
50
100
150
200
250
300
350
35
85
135
185
235



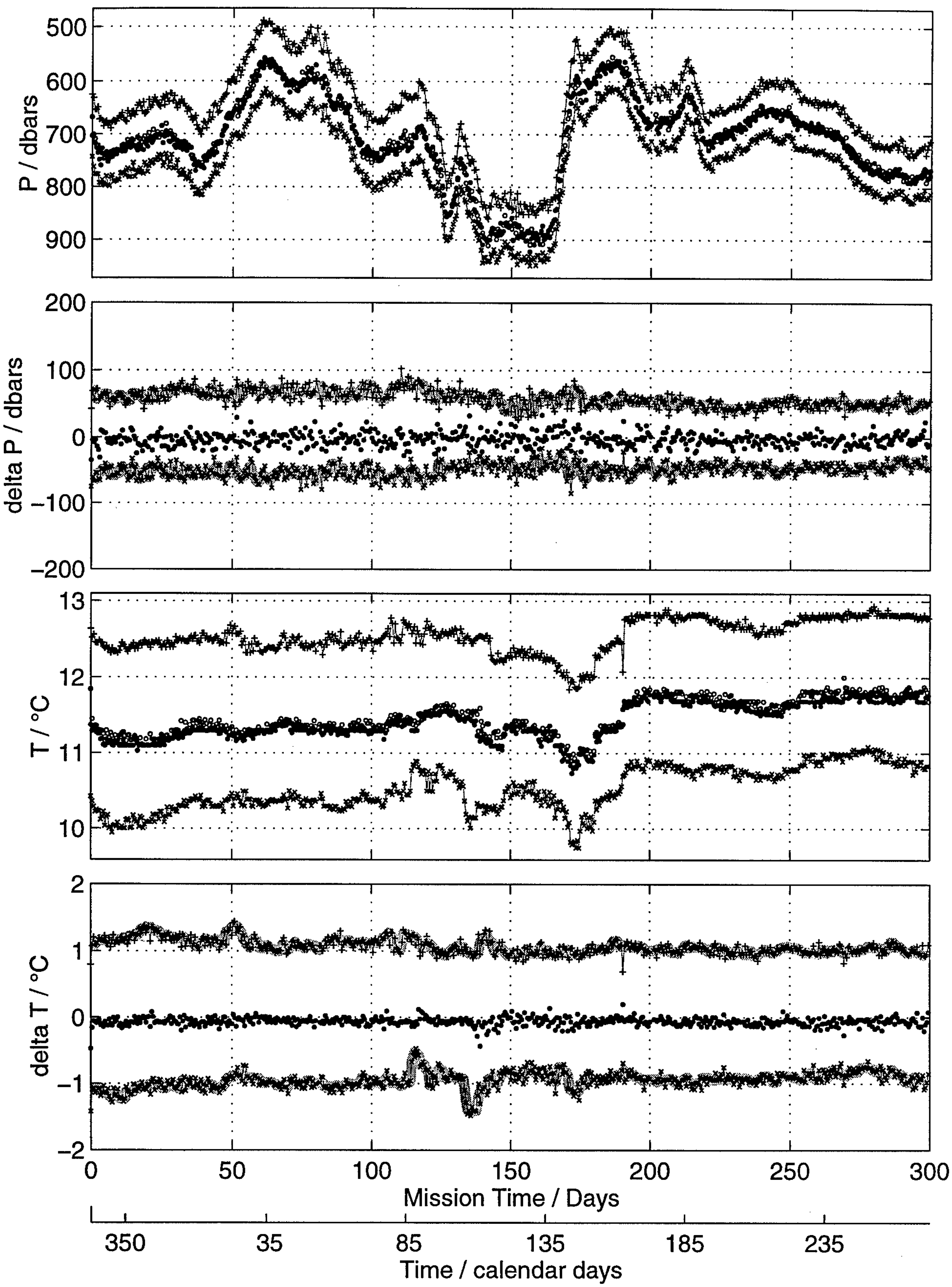
NAC Float 299 – Vocha Data
P / dbars
0
100
200
300
delta P / dbars
200
100
0
−100
−200
T / °C
20
15
10
5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days


NAC Float 300 – YearDay Start 342.0
Latitude / °N
47
46
45
44
43
42
41
40
39
38
52
50
48
46
44
42
40
38
Longitude / °W
200
250
P / dbars
200
400
600
800
1000
T / °C
8
6
4
2
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days

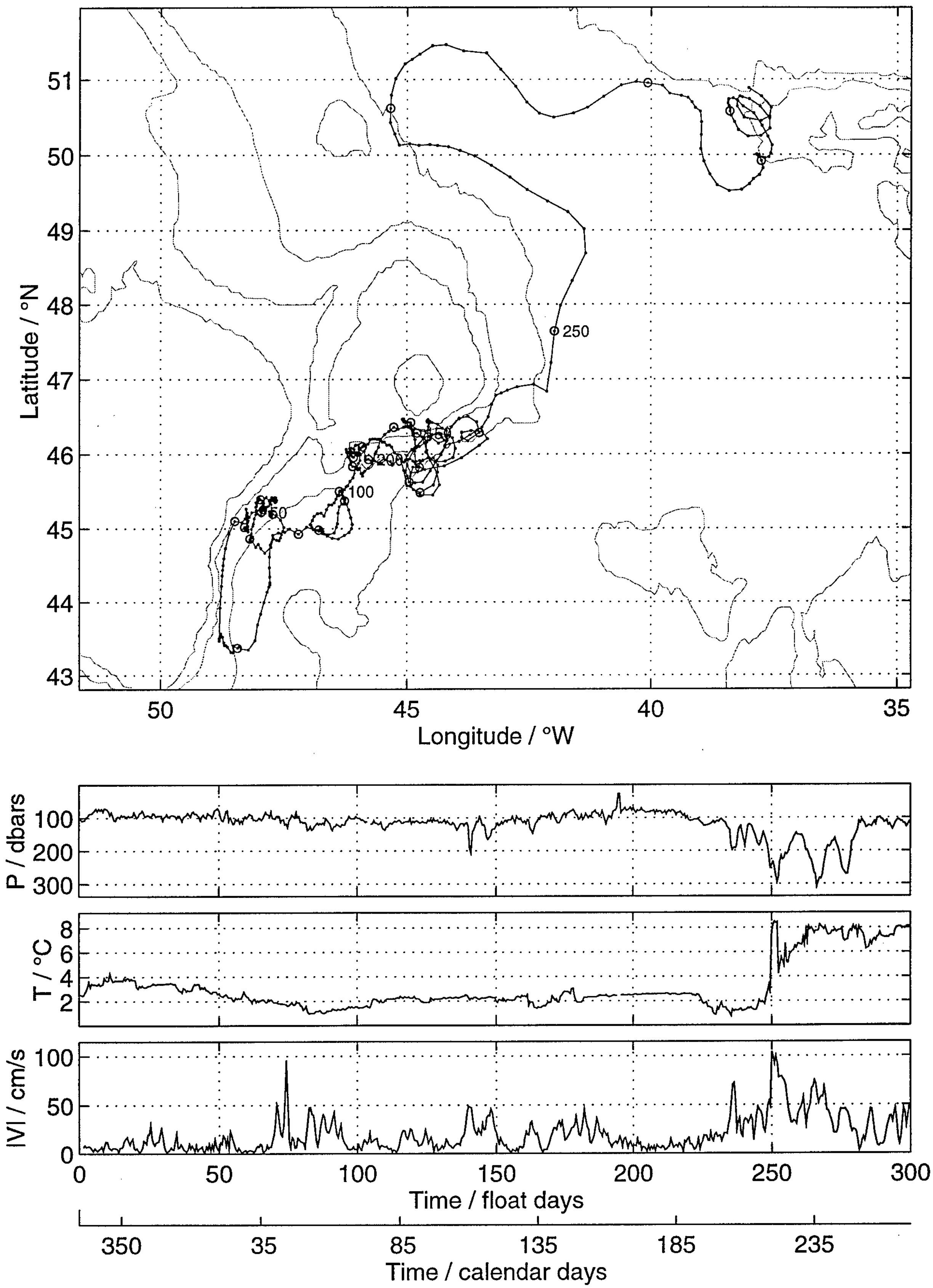

NAC Float 300 – Vocha Data
P / dbars
200
400
600
800
1000
delta P / dbars
200
100
0
−100
−200
T / °C
8
6
4
2
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

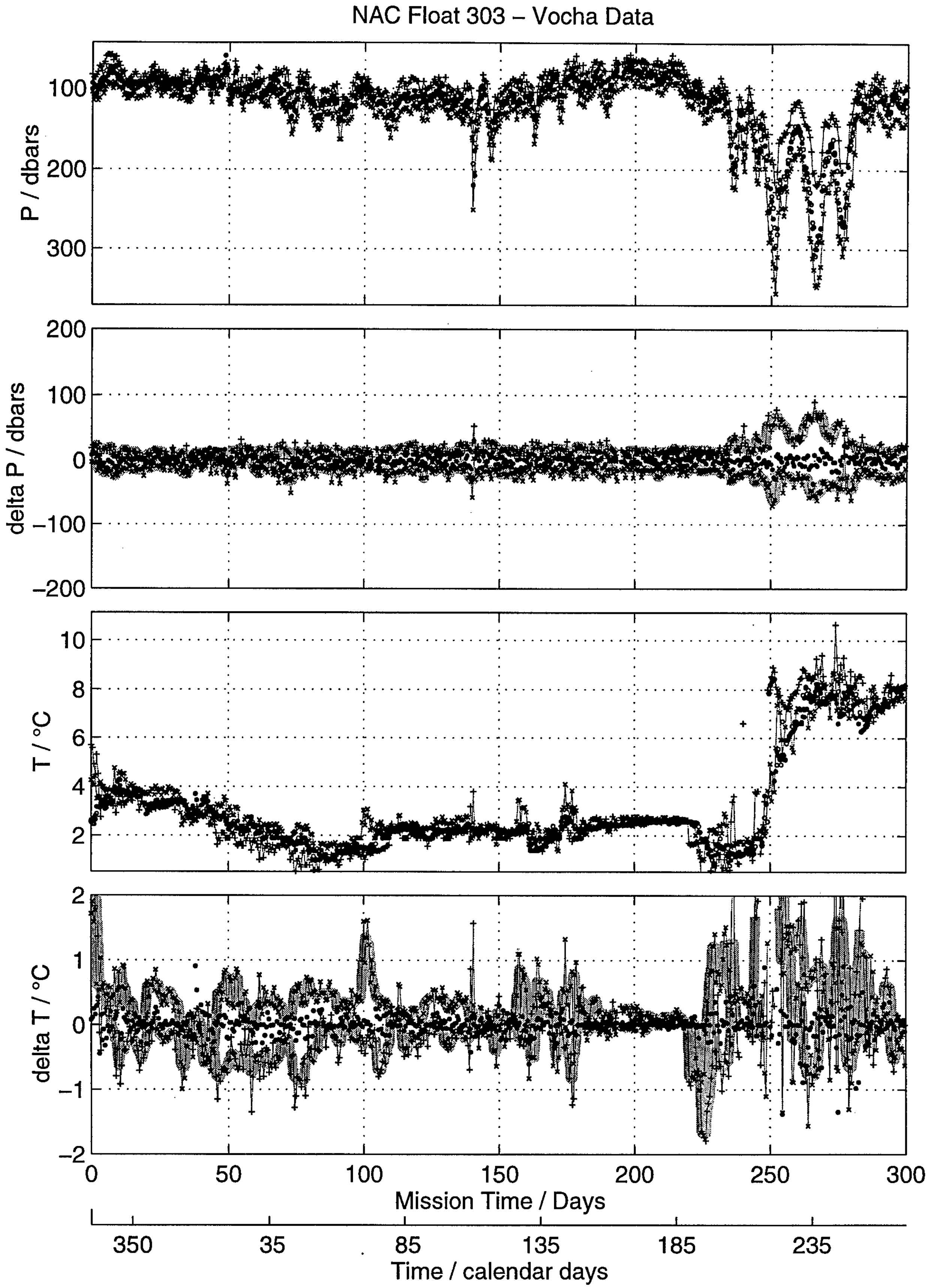

NAC Float 301 – YearDay Start 338.0
Latitude / °N
Longitude / °W
50
100
150
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

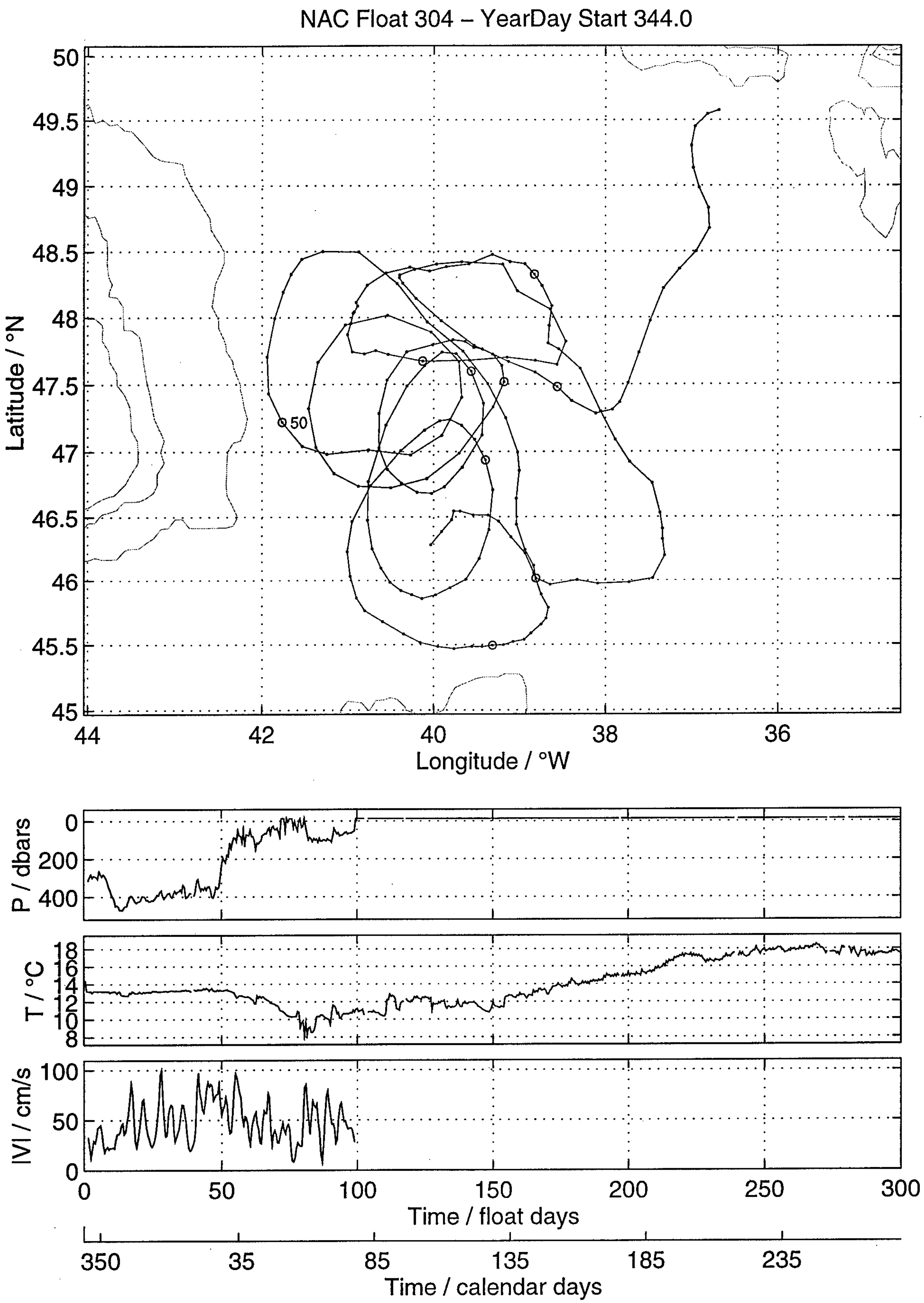
NAC Float 301 – Vocha Data

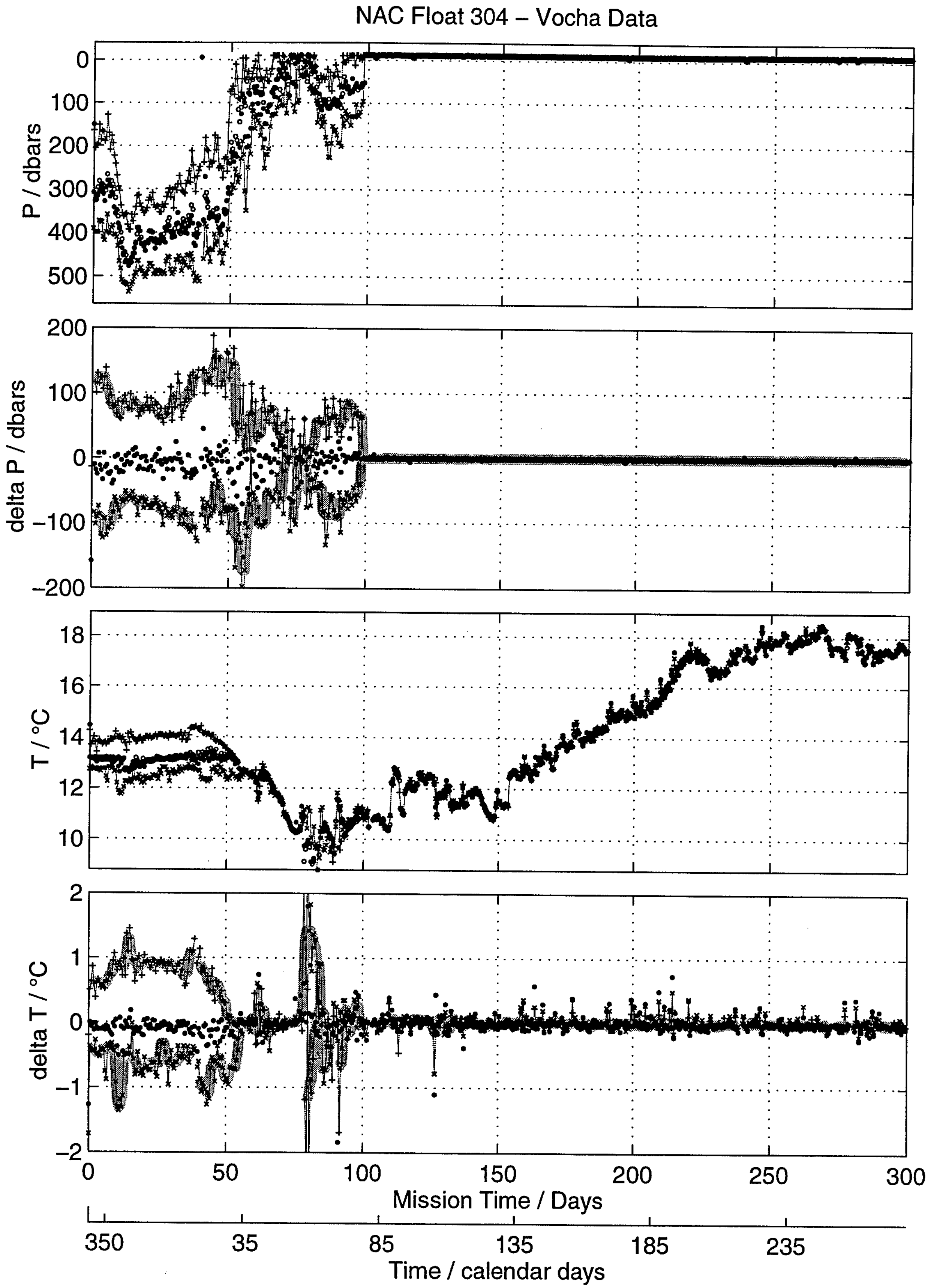


NAC Float 303 – YearDay Start 335.0

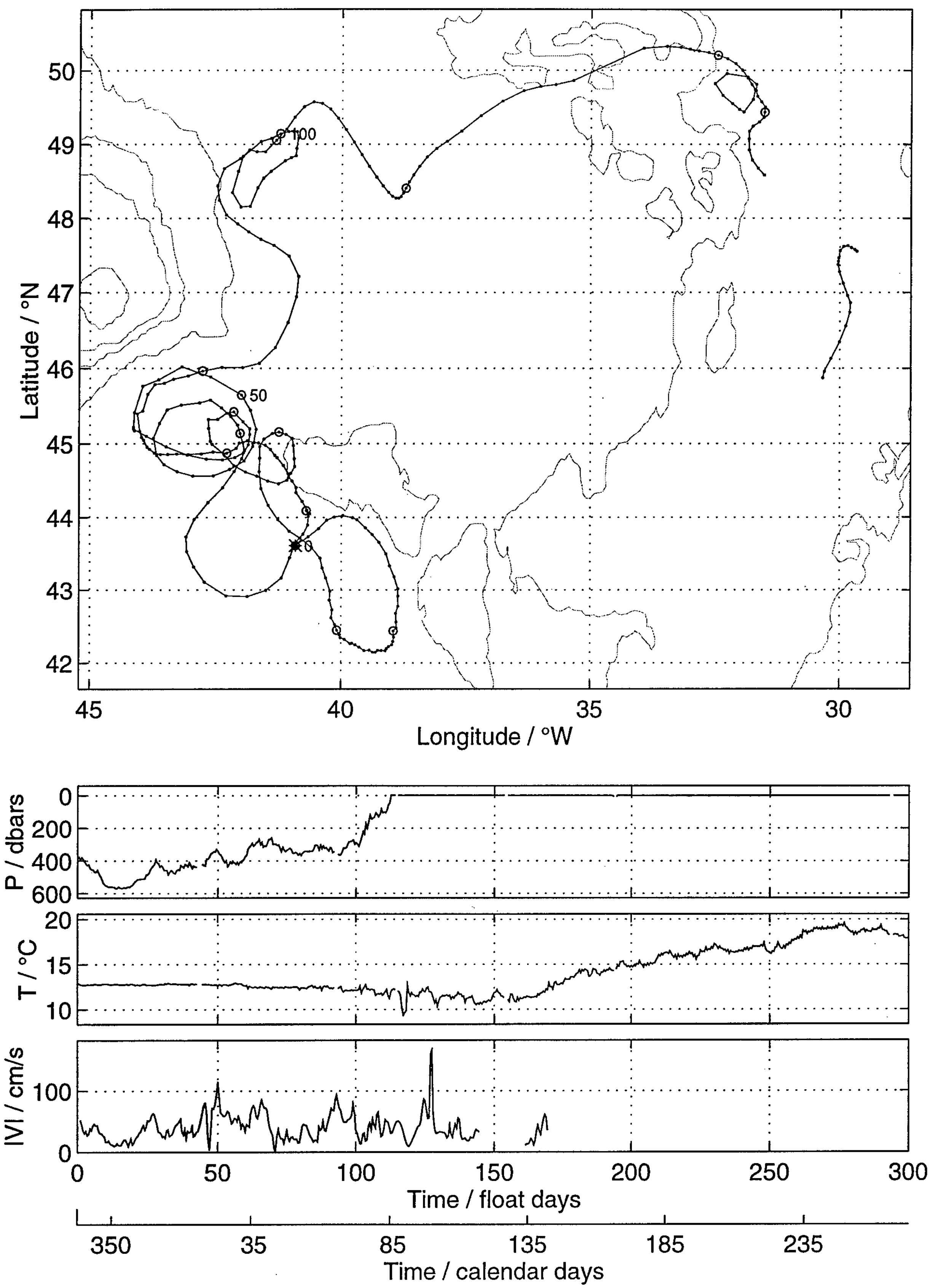


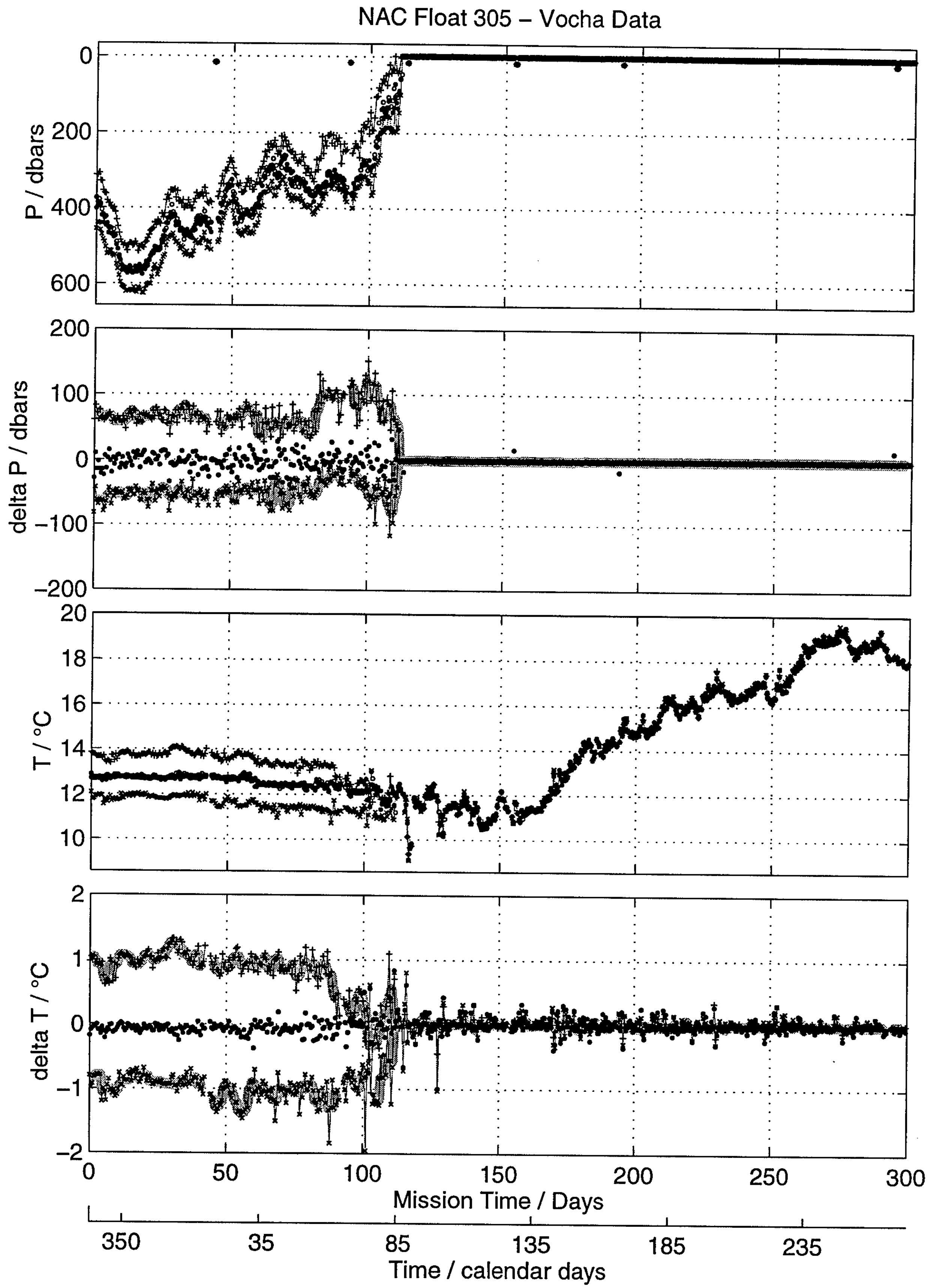

NAC Float 303 – Vocha Data
P / dbars
100
200
300
delta P / dbars
200
100
0
−100
−200
T / °C
10
8
6
4
2
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

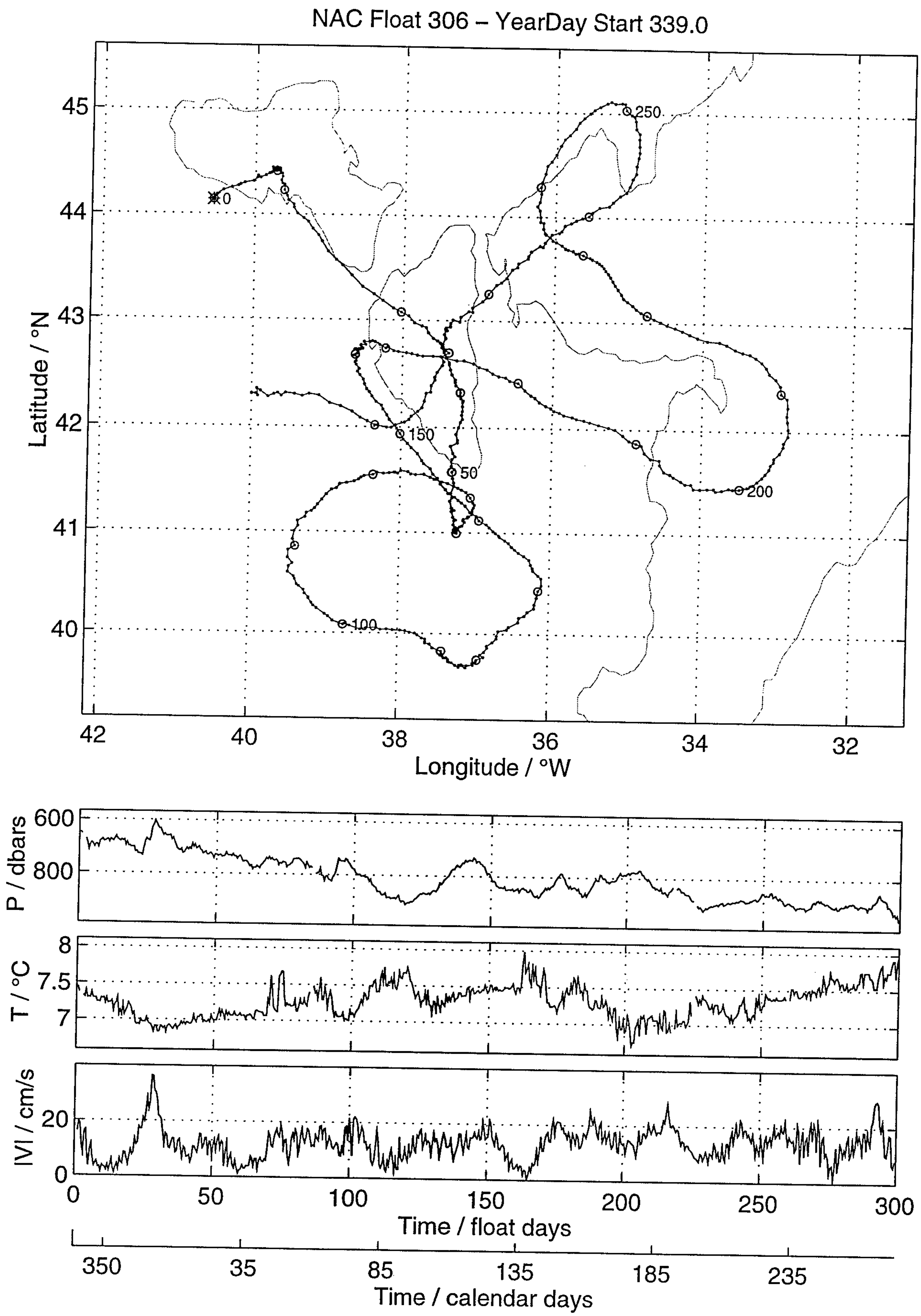

NAC Float 304 – YearDay Start 344.0
Latitude / °N
Longitude / °W
50
49.5
49
48.5
48
47.5
47
46.5
46
45.5
45
44
42
40
38
36
50
P / dbars
0
200
400
T / °C
18
16
14
12
10
8
|V| / cm/s
100
50
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days


NAC Float 304 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days

NAC Float 305 – YearDay Start 338.0

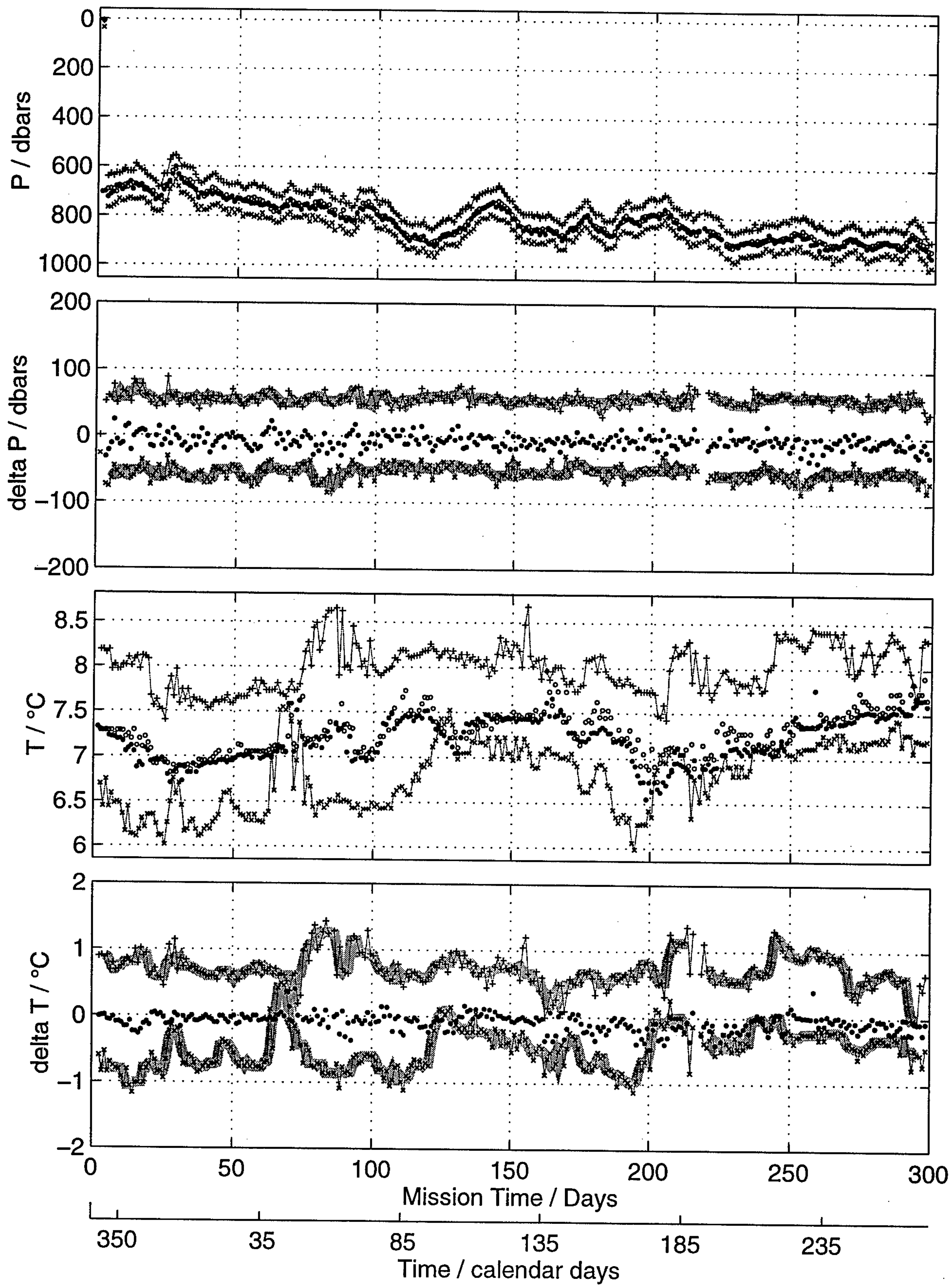


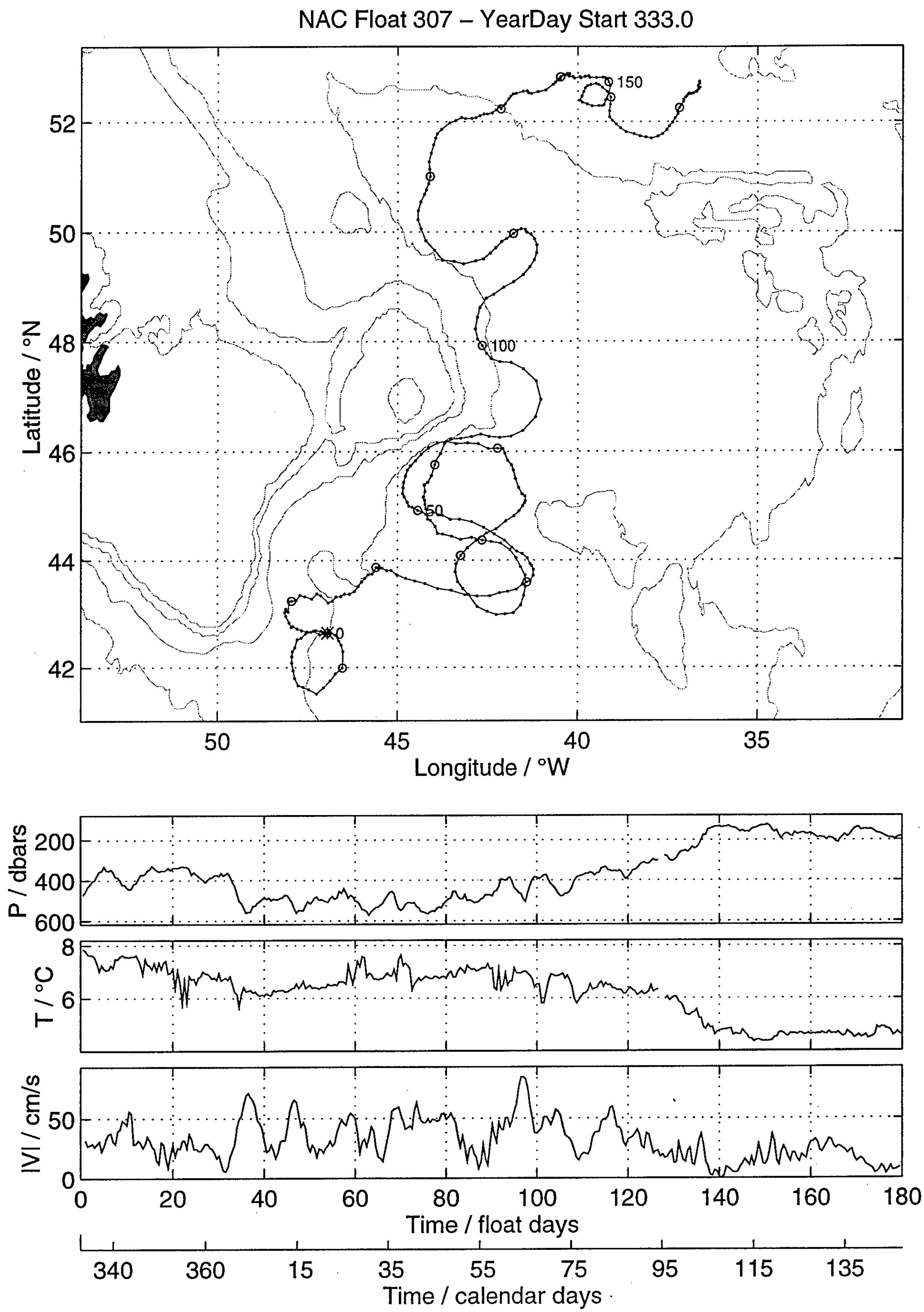

NAC Float 305 – Vocha Data
P / dbars
0
200
400
600
delta P / dbars
200
100
0
−100
−200
T / °C
20
18
16
14
12
10
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

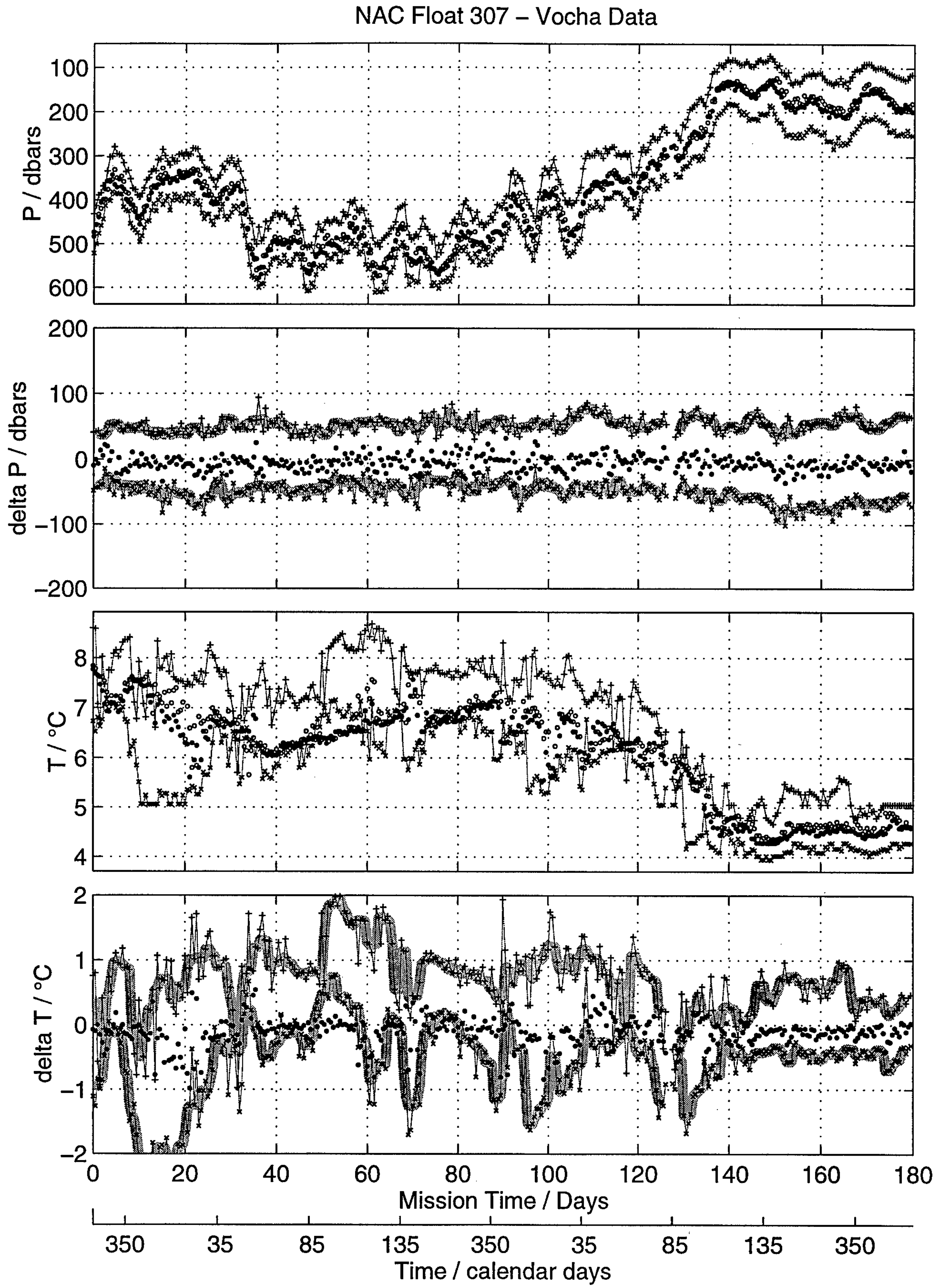


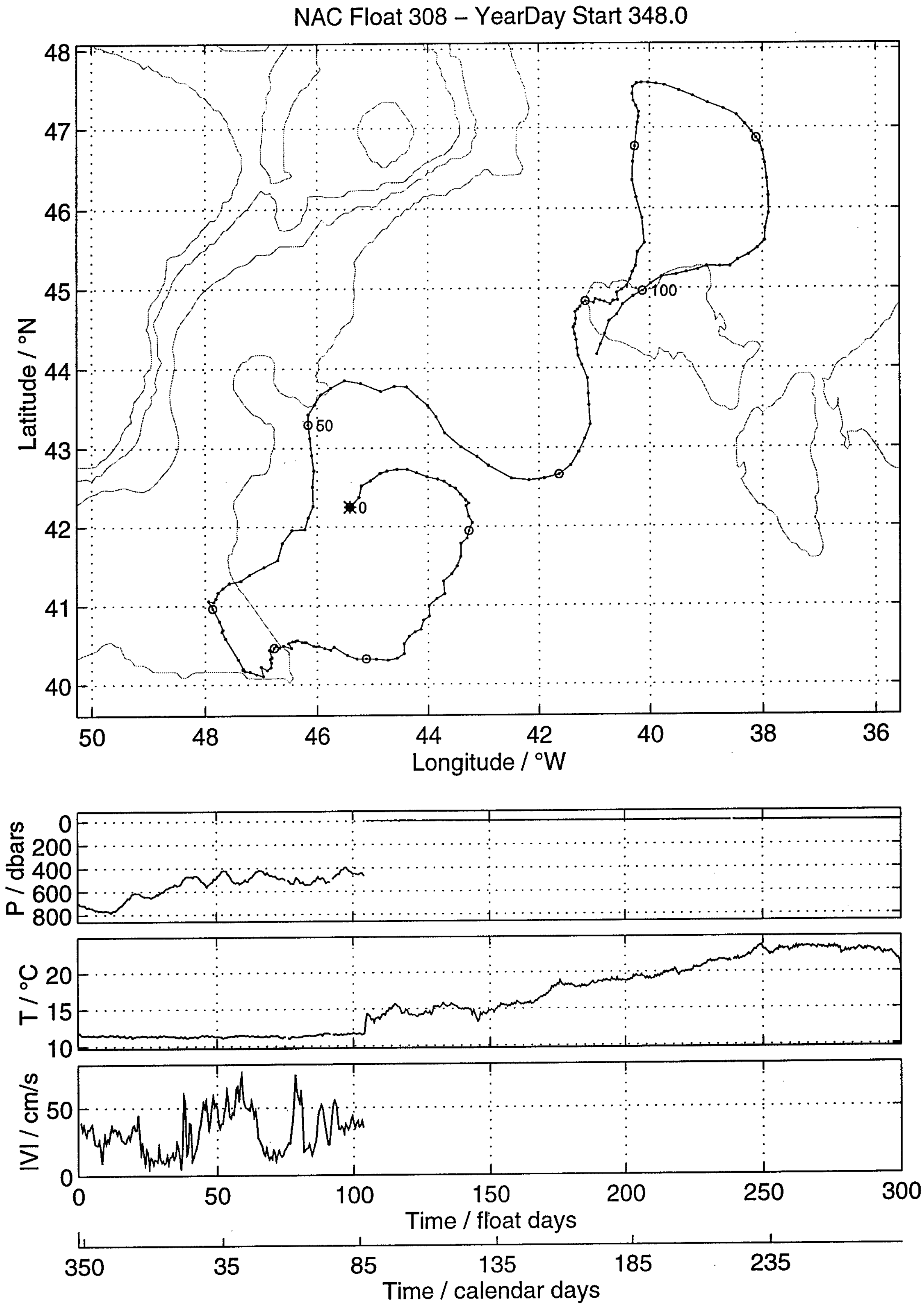
NAC Float 306 – YearDay Start 339.0
Latitude / °N
Longitude / °W
45
44
43
42
41
40
42
40
38
36
34
32
0
50
100
150
200
250
P / dbars
600
800
T / °C
8
7.5
7
|V| / cm/s
20
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days

NAC Float 306 – Vocha Data

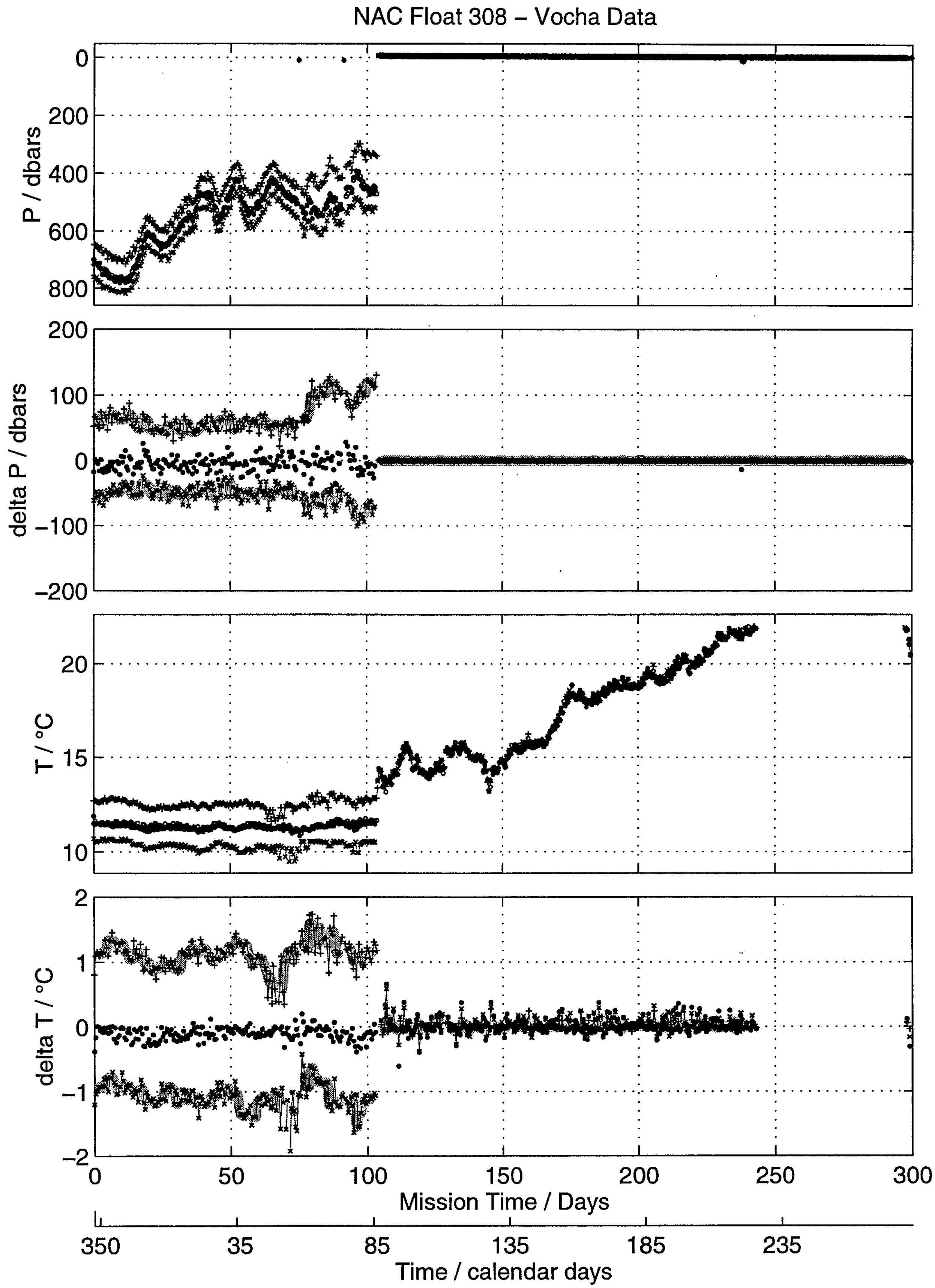


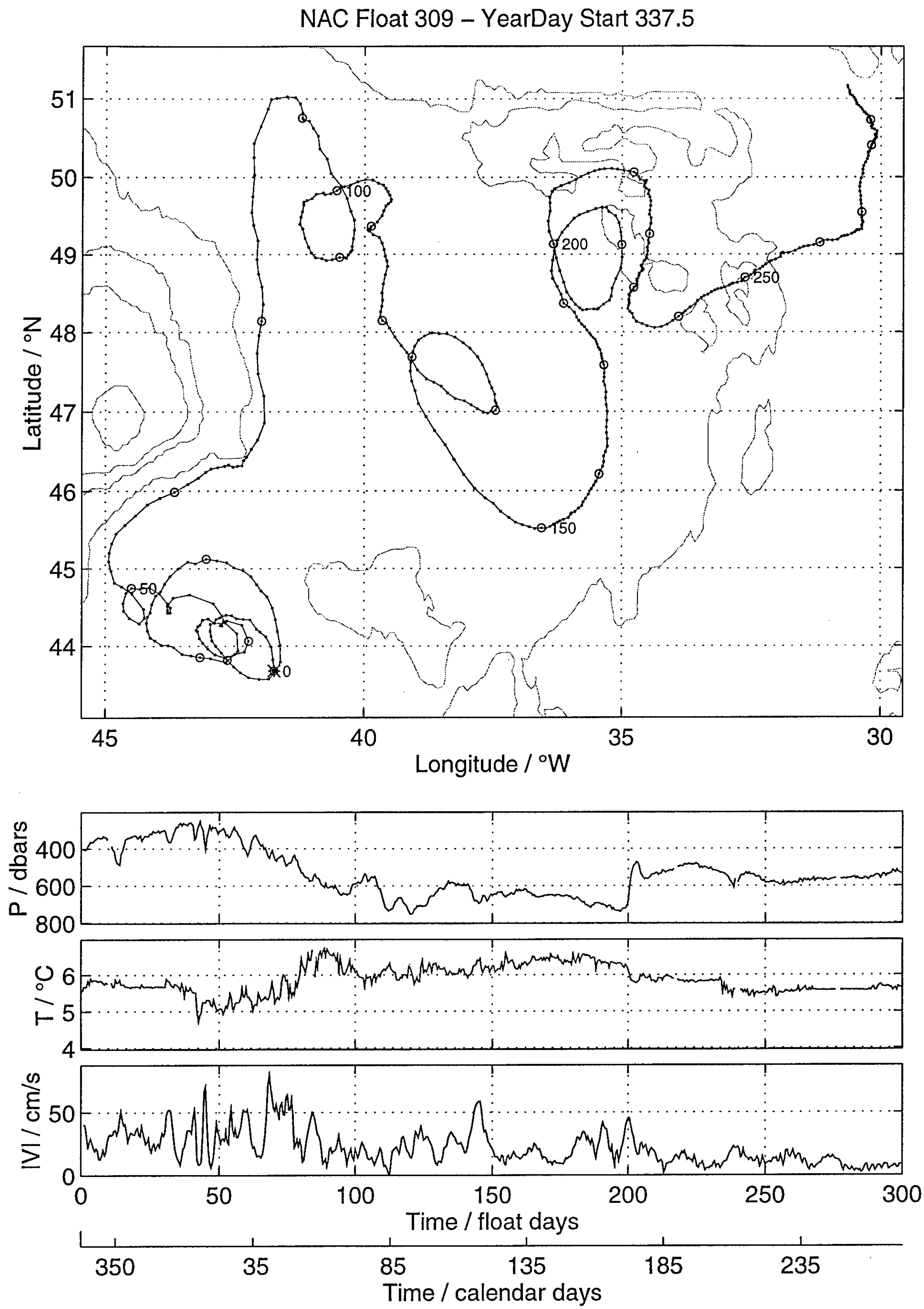

NAC Float 307 – YearDay Start 333.0
Latitude / °N
Longitude / °W
52
50
48
46
44
42
50
45
40
35
150
100
50
0
P / dbars
200
400
600
T / °C
8
6
|V| / cm/s
50
0
0
20
40
60
80
100
120
140
160
180
Time / float days
340
360
15
35
55
75
95
115
135
Time / calendar days


NAC Float 307 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days
0
20
40
60
80
100
120
140
160
180
350
35
85
135
350
35
85
135
350



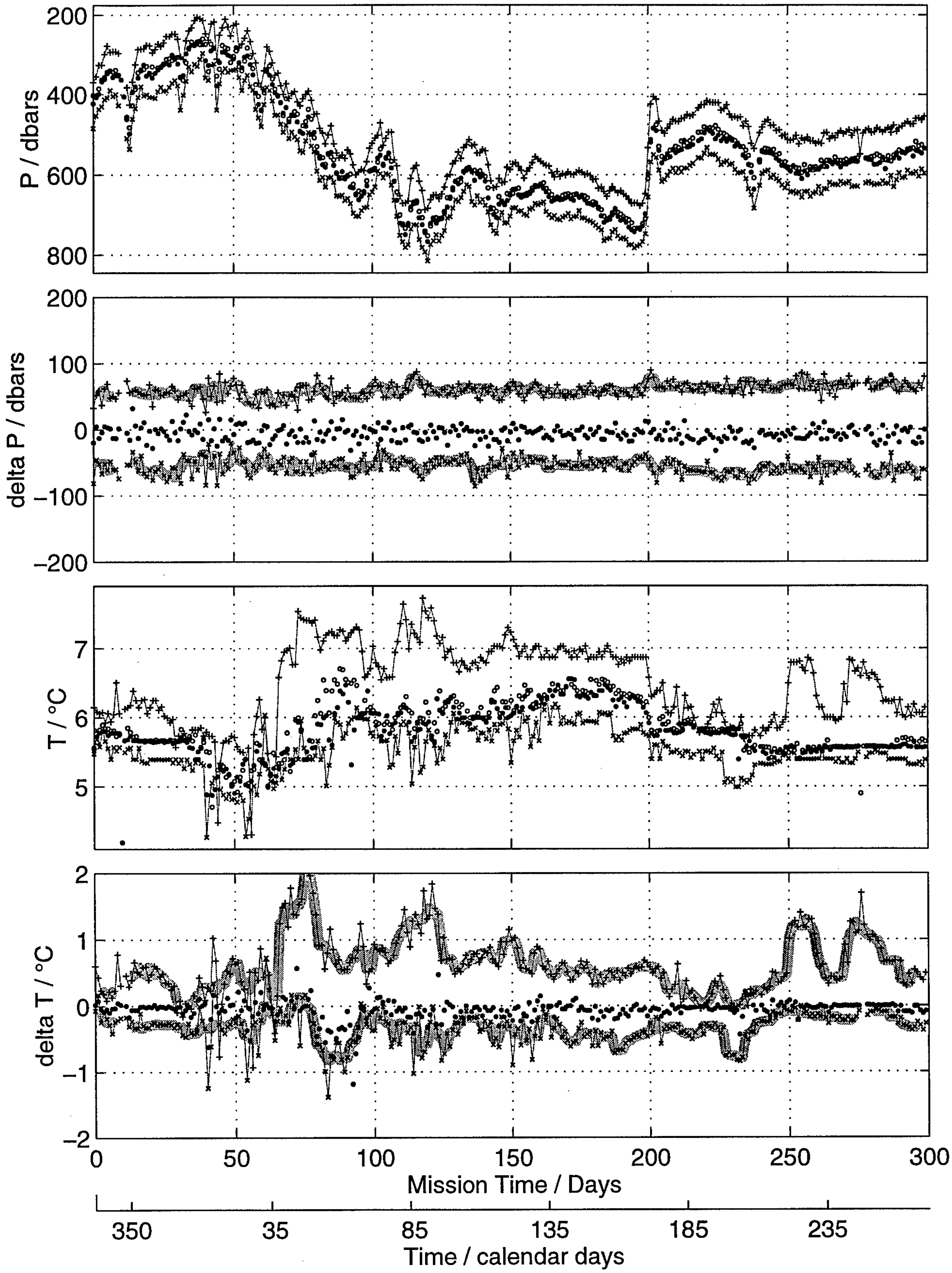
NAC Float 308 – YearDay Start 348.0
Latitude / °N
Longitude / °W
0
50
100
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

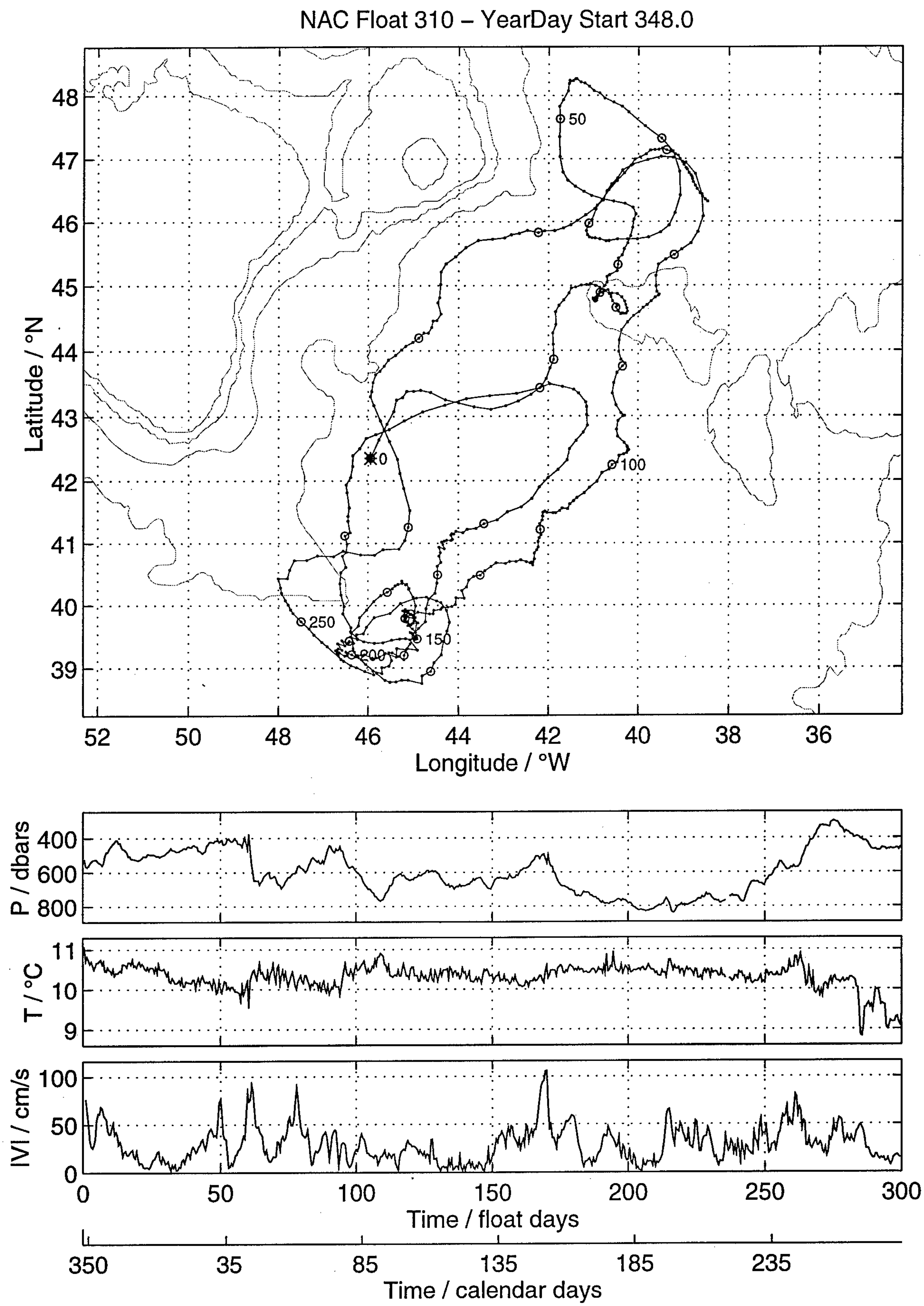

NAC Float 308 – Vocha Data
P / dbars
0
200
400
600
800
delta P / dbars
200
100
0
−100
−200
T / °C
20
15
10
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

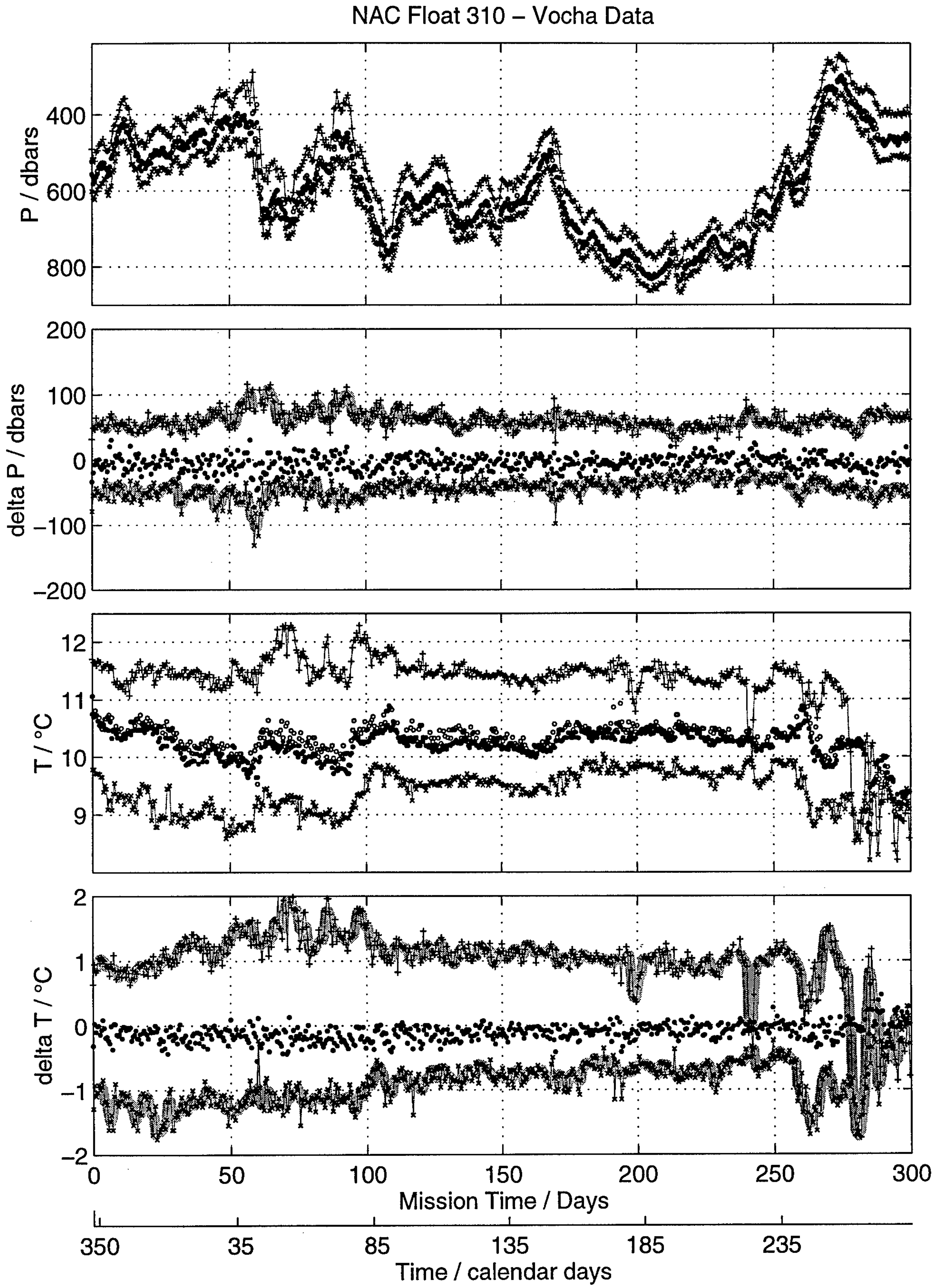


NAC Float 309 – YearDay Start 337.5
Latitude / °N
Longitude / °W
51
50
49
48
47
46
45
44
45
40
35
30
0
50
100
150
200
250
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days
350
35
85
135
185
235

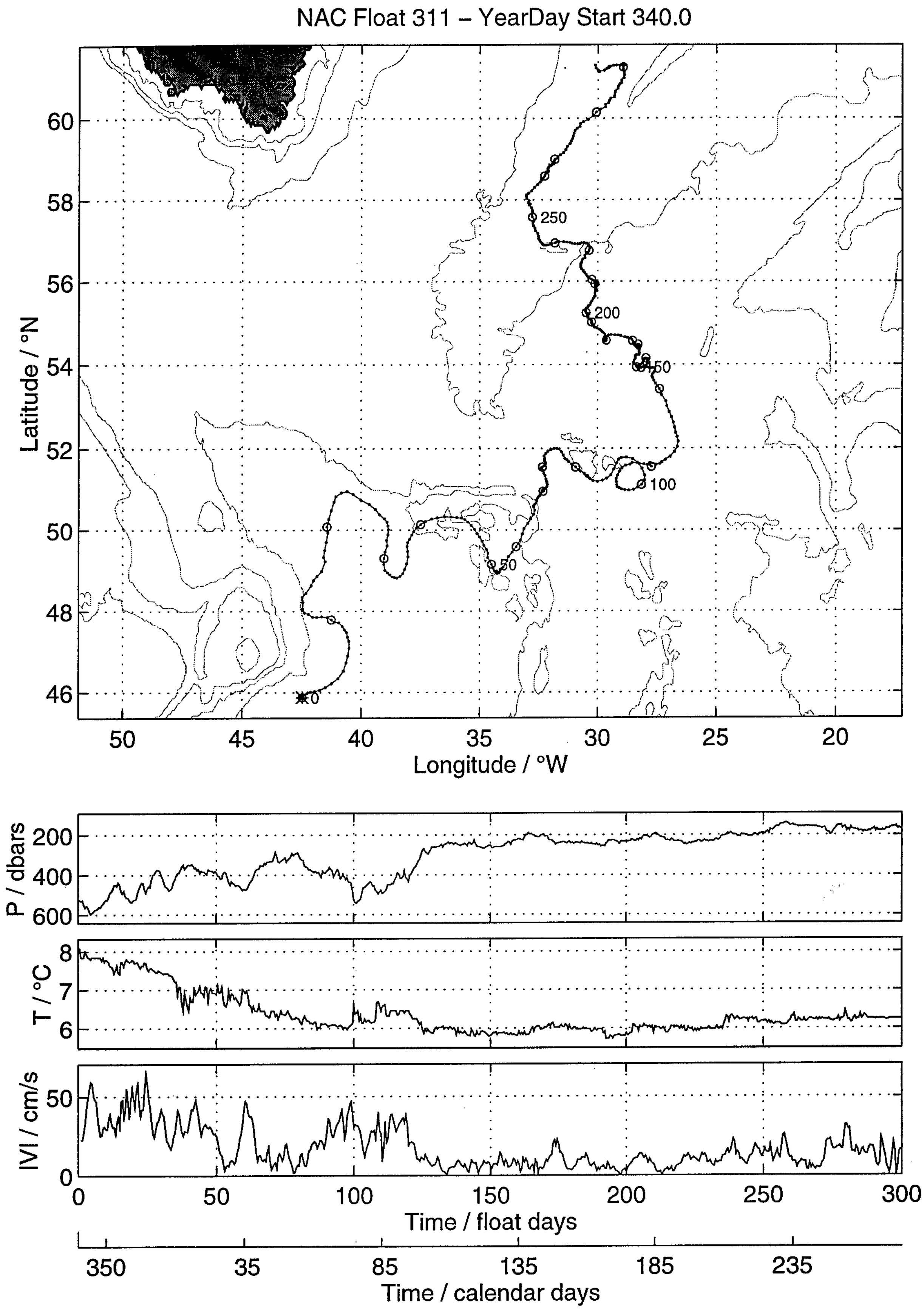
NAC Float 309 – Vocha Data

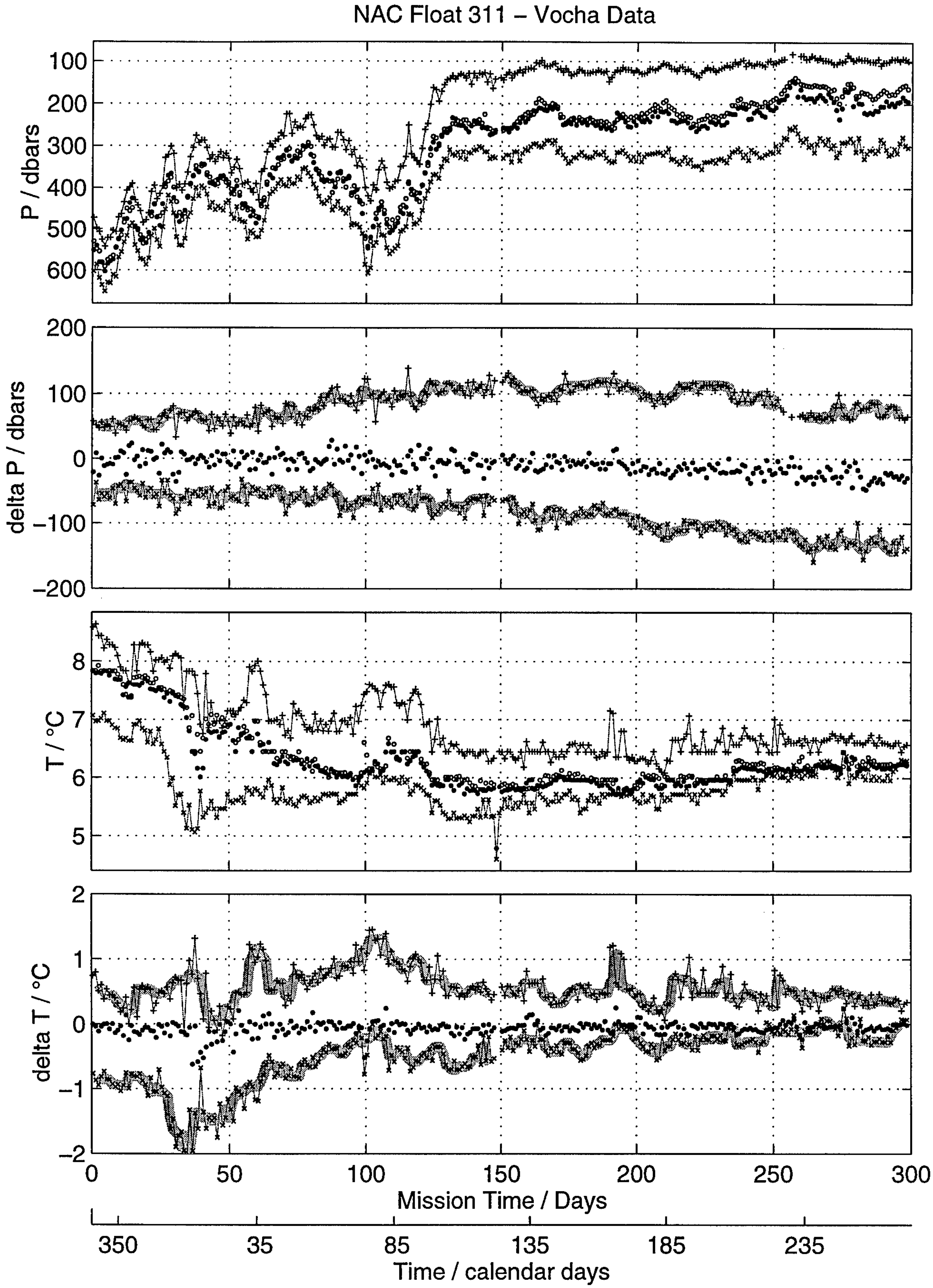


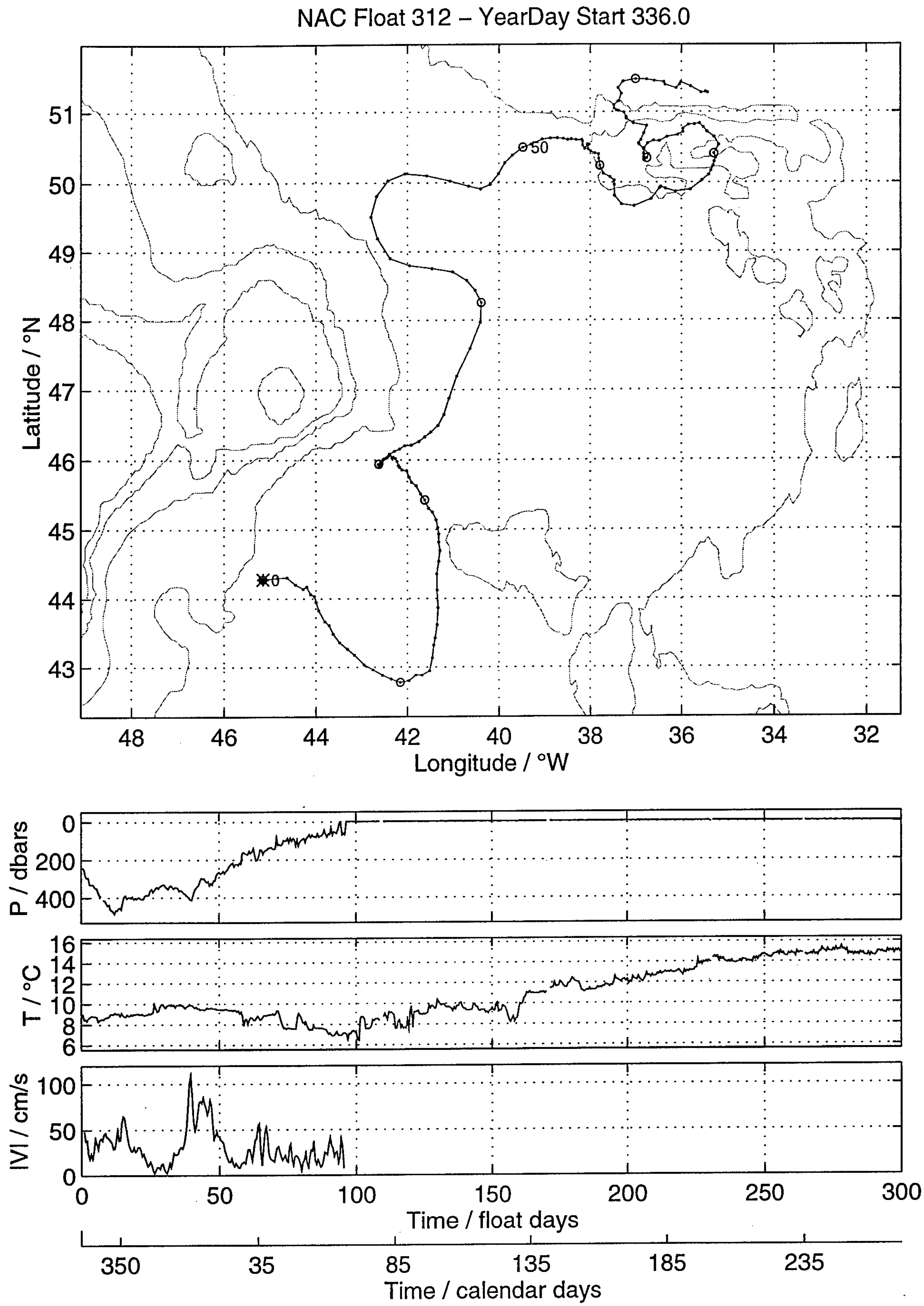

NAC Float 310 – YearDay Start 348.0
Latitude / °N
Longitude / °W
52
50
48
46
44
42
40
38
36
48
47
46
45
44
43
42
41
40
39
0
50
100
150
200
250
P / dbars
400
600
800
T / °C
11
10
9
|V| / cm/s
100
50
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days



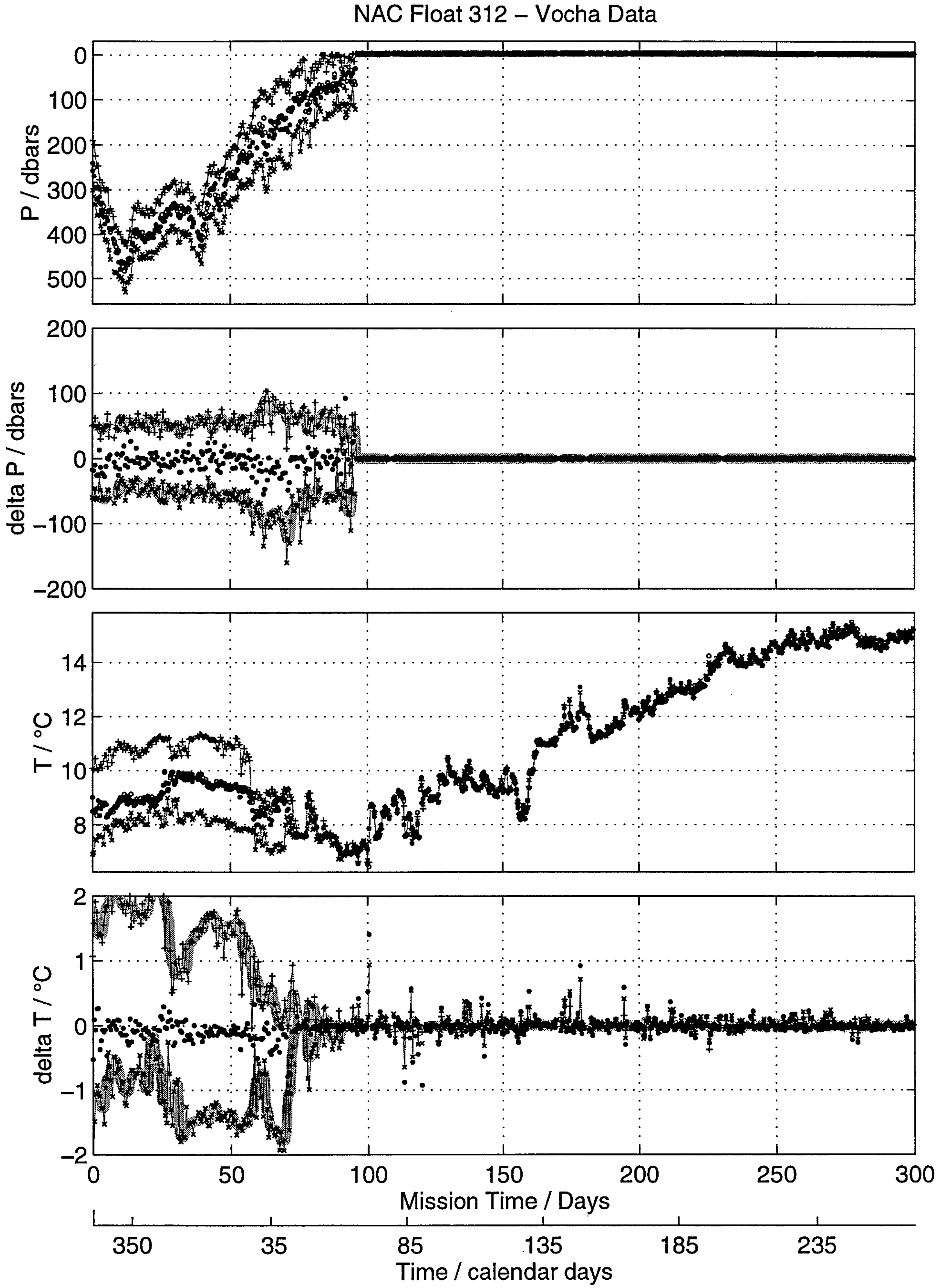
NAC Float 310 – Vocha Data
P / dbars
400
600
800
delta P / dbars
200
100
0
−100
−200
T / °C
12
11
10
9
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days


NAC Float 311 – YearDay Start 340.0
Latitude / °N
Longitude / °W
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

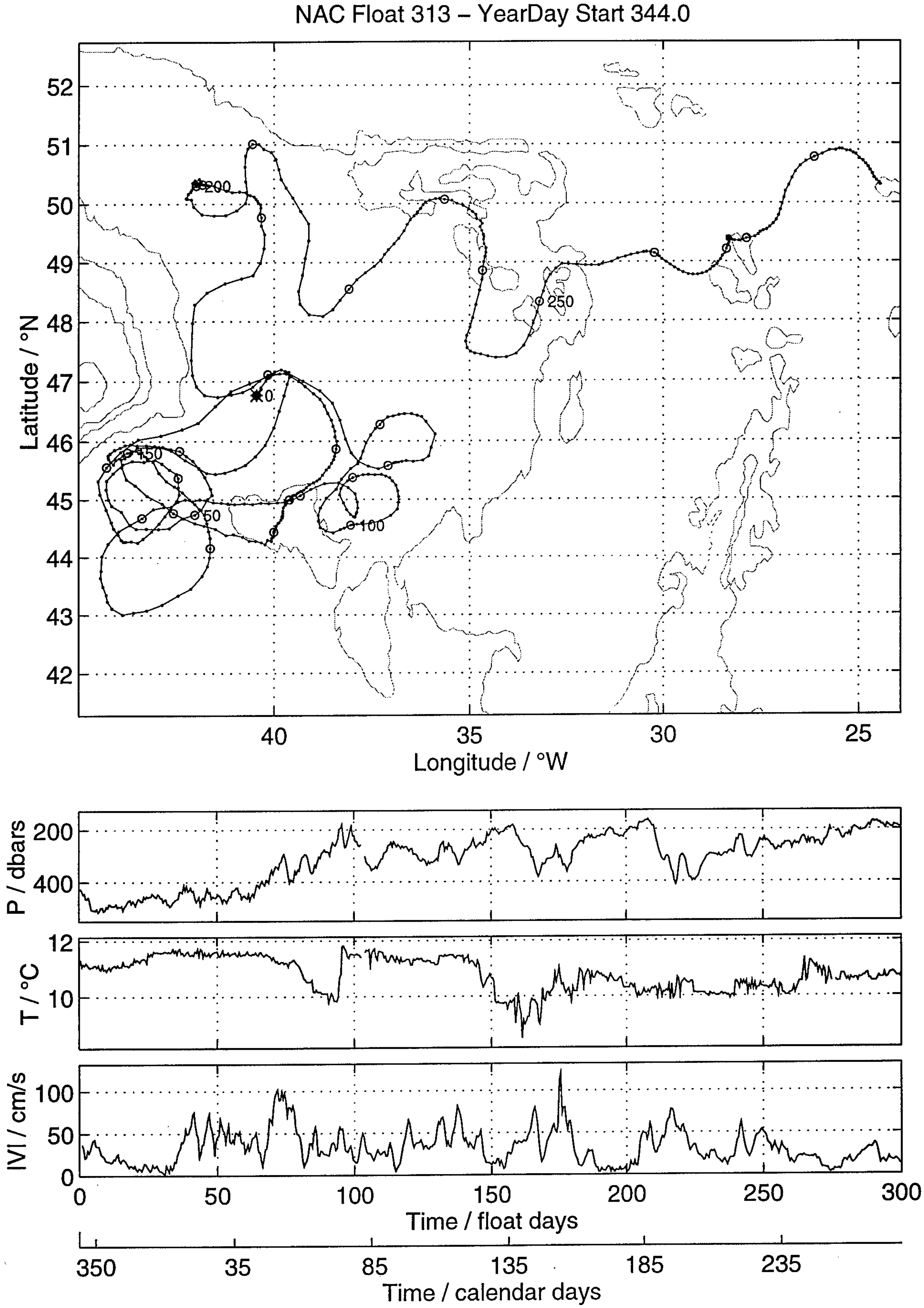

NAC Float 311 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days

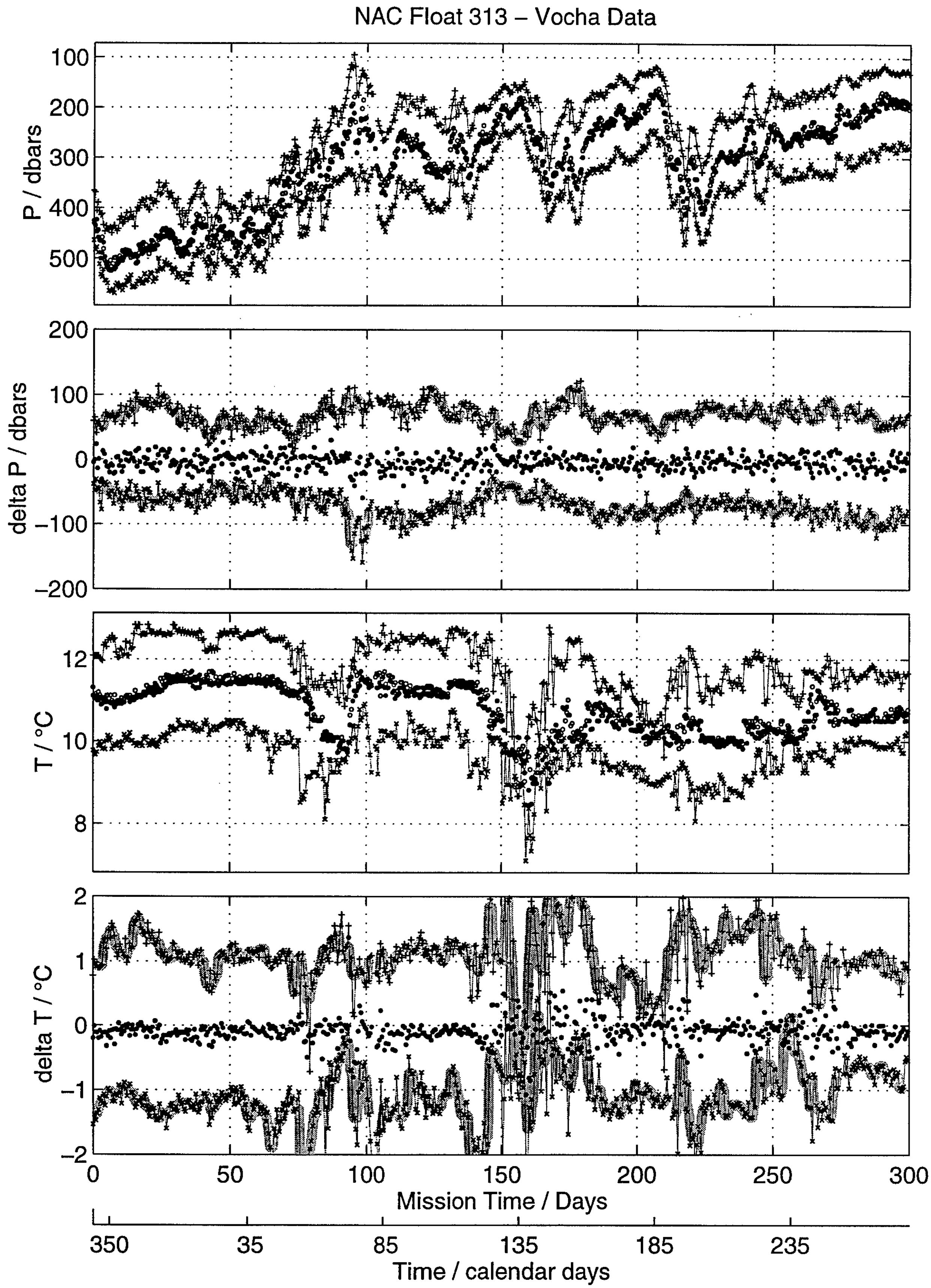


NAC Float 312 – YearDay Start 336.0
Latitude / °N
Longitude / °W
50
0
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

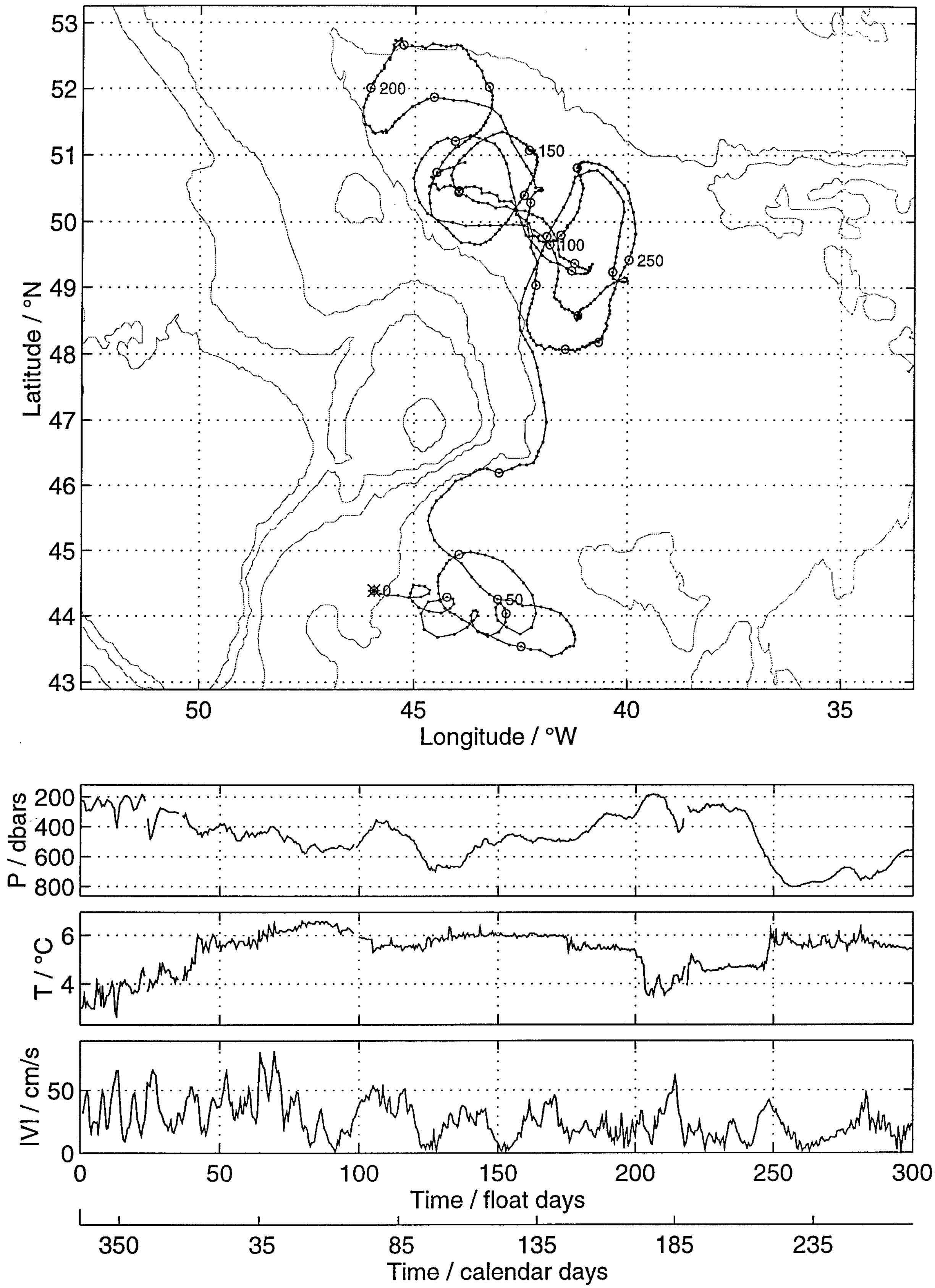


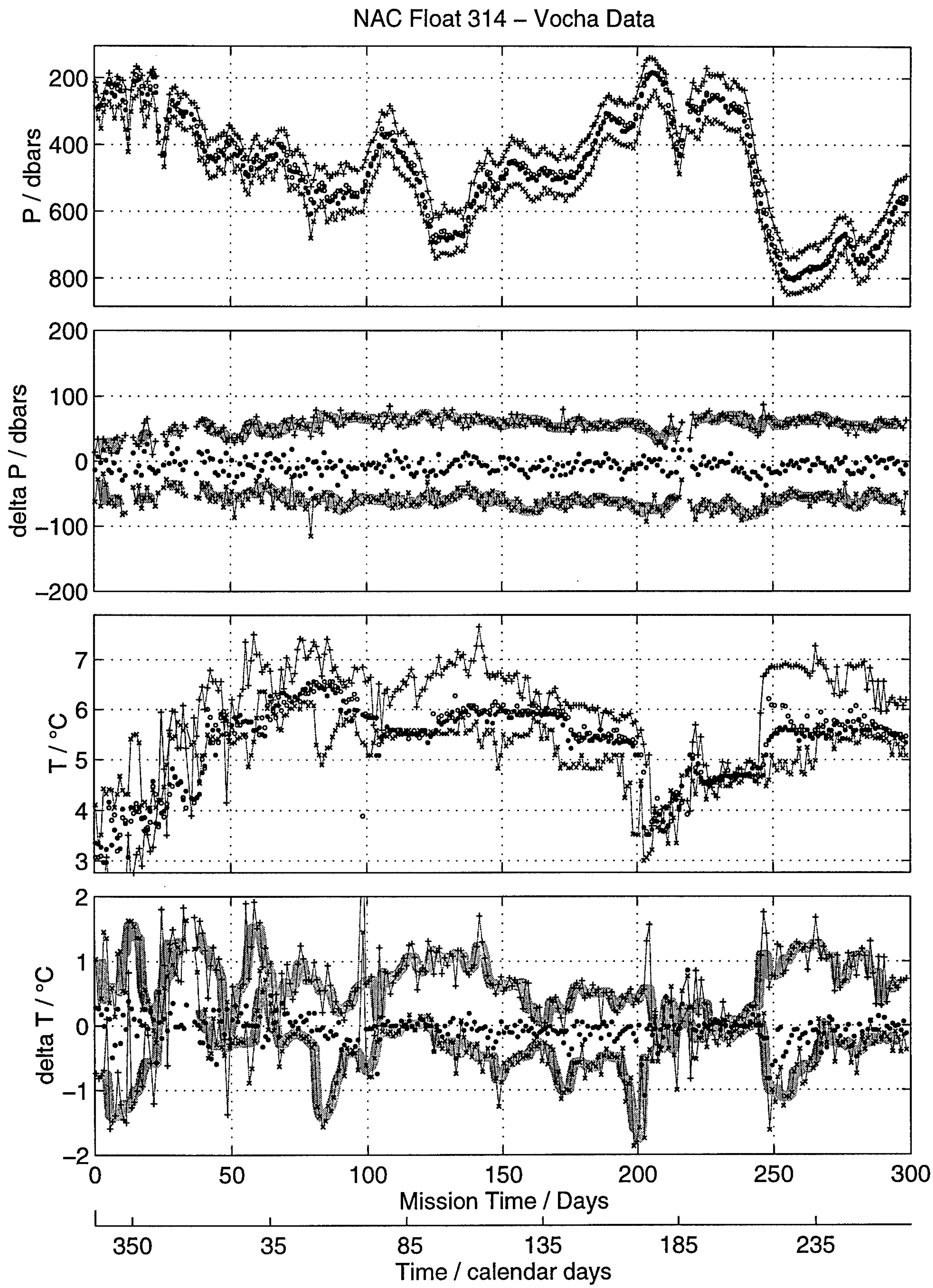
NAC Float 312 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days

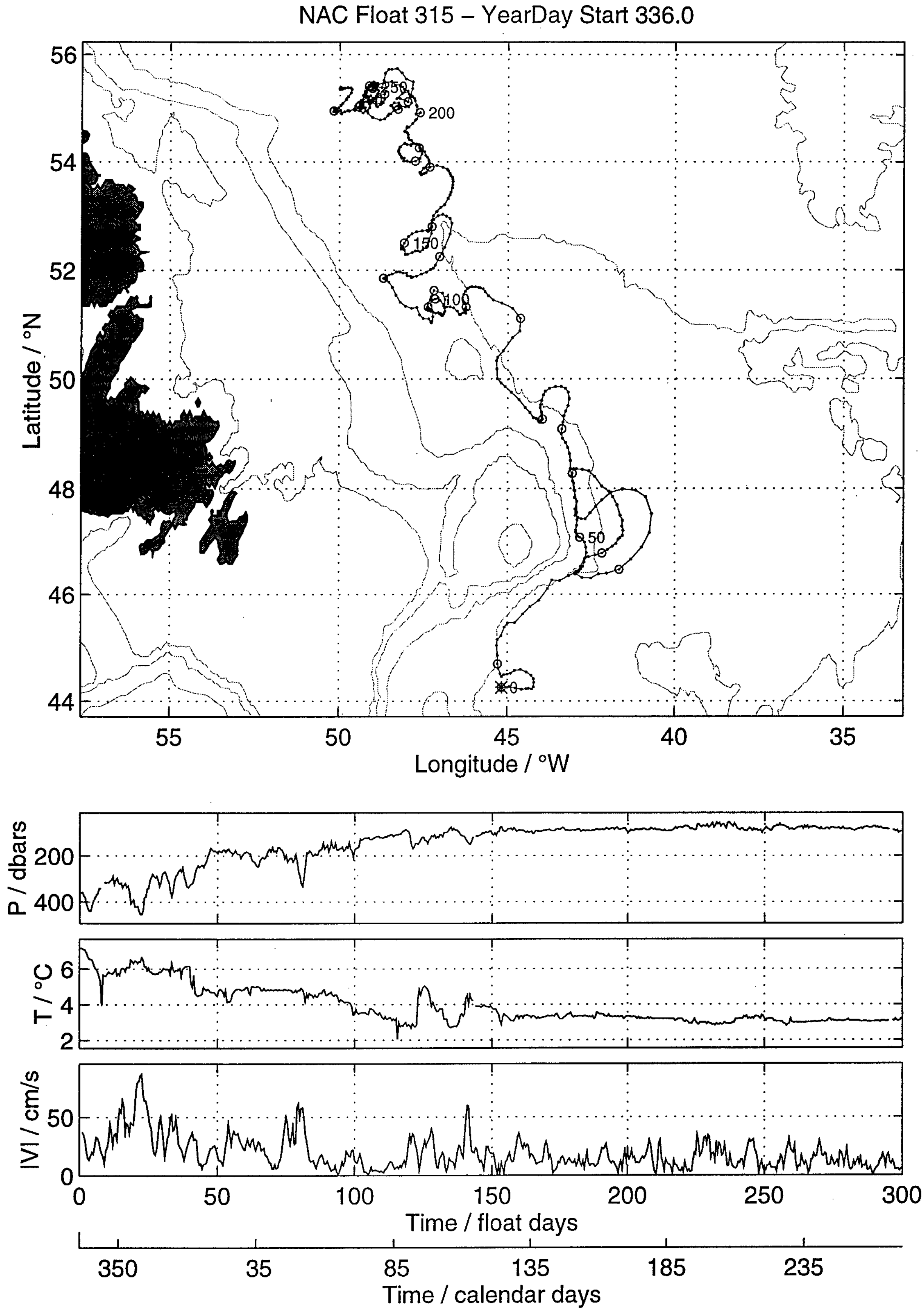

NAC Float 313 – YearDay Start 344.0
Latitude / °N
Longitude / °W
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

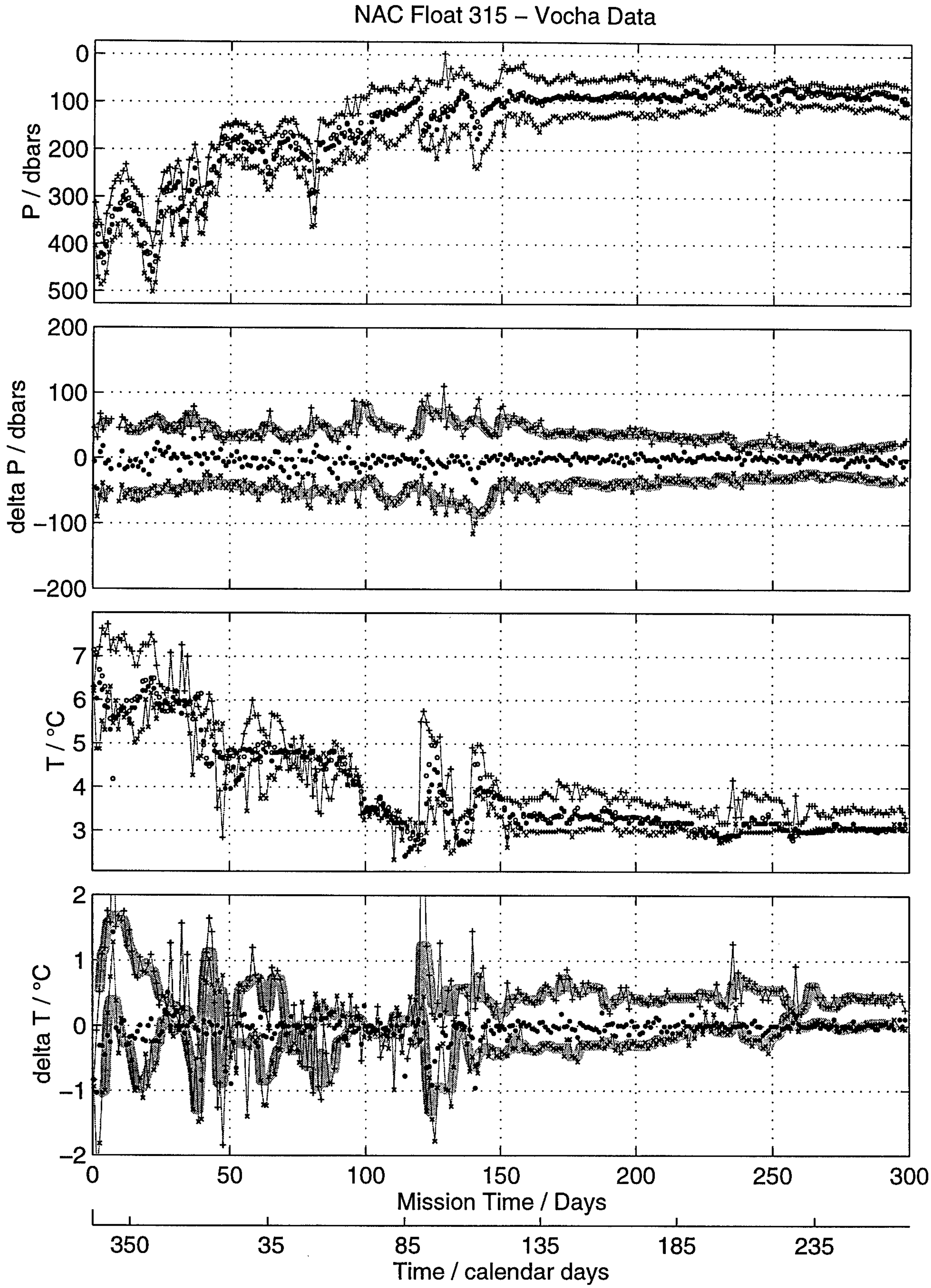

NAC Float 313 – Vocha Data
P / dbars
100
200
300
400
500
delta P / dbars
200
100
0
−100
−200
T / °C
12
10
8
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

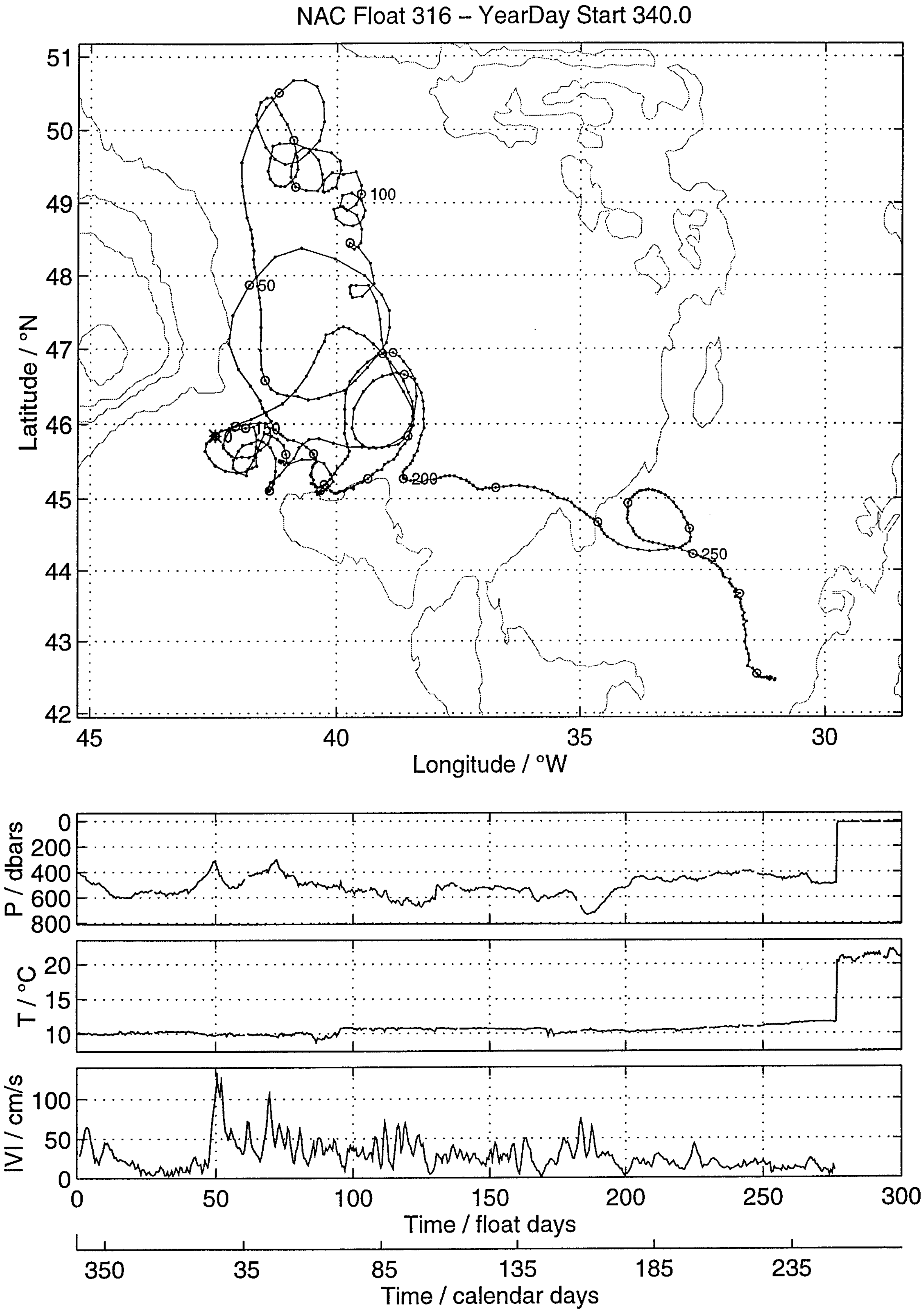
NAC Float 314 – YearDay Start 336.0

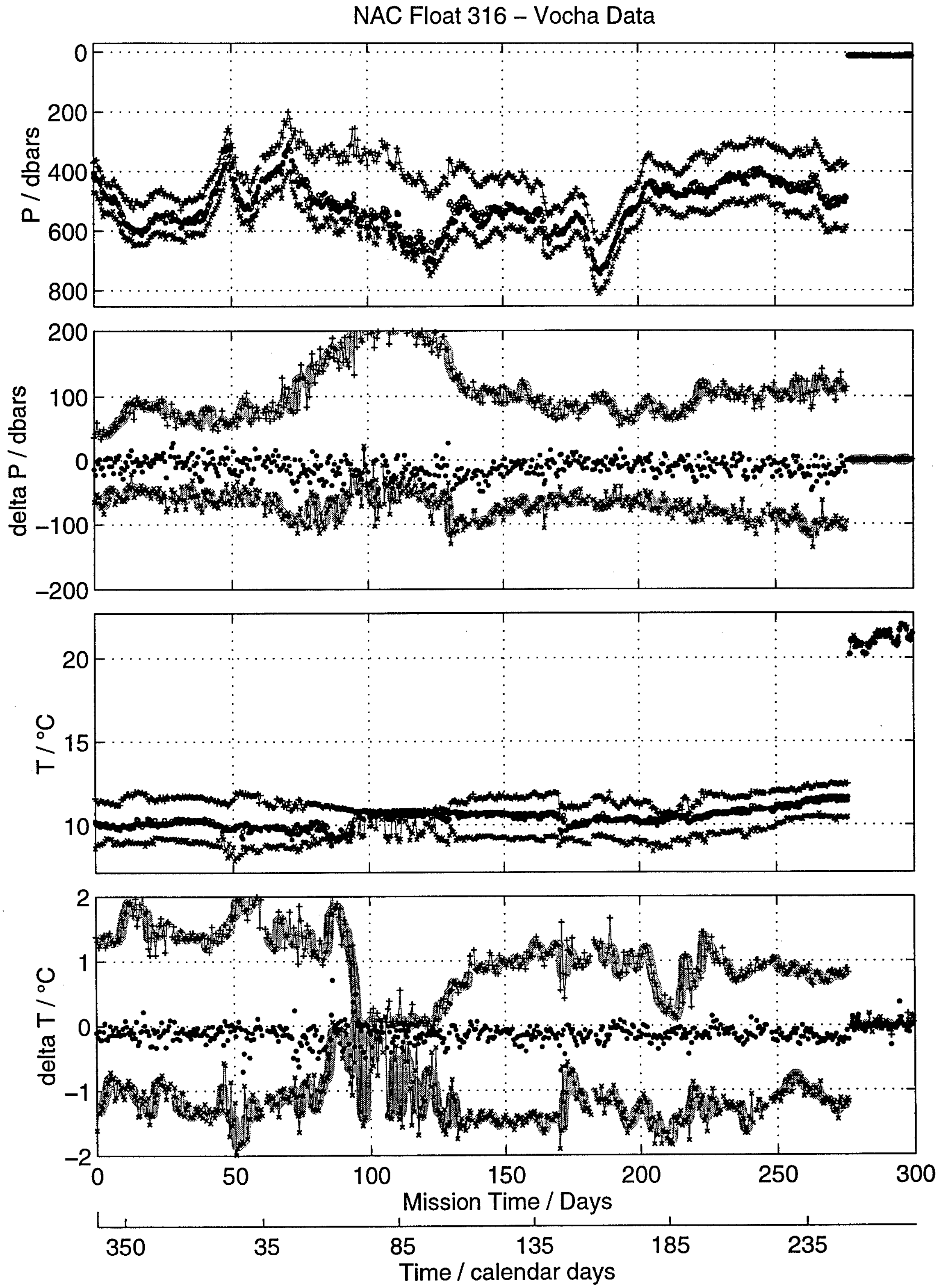



NAC Float 314 – Vocha Data
P / dbars
200
400
600
800
delta P / dbars
200
100
0
−100
−200
T / °C
7
6
5
4
3
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

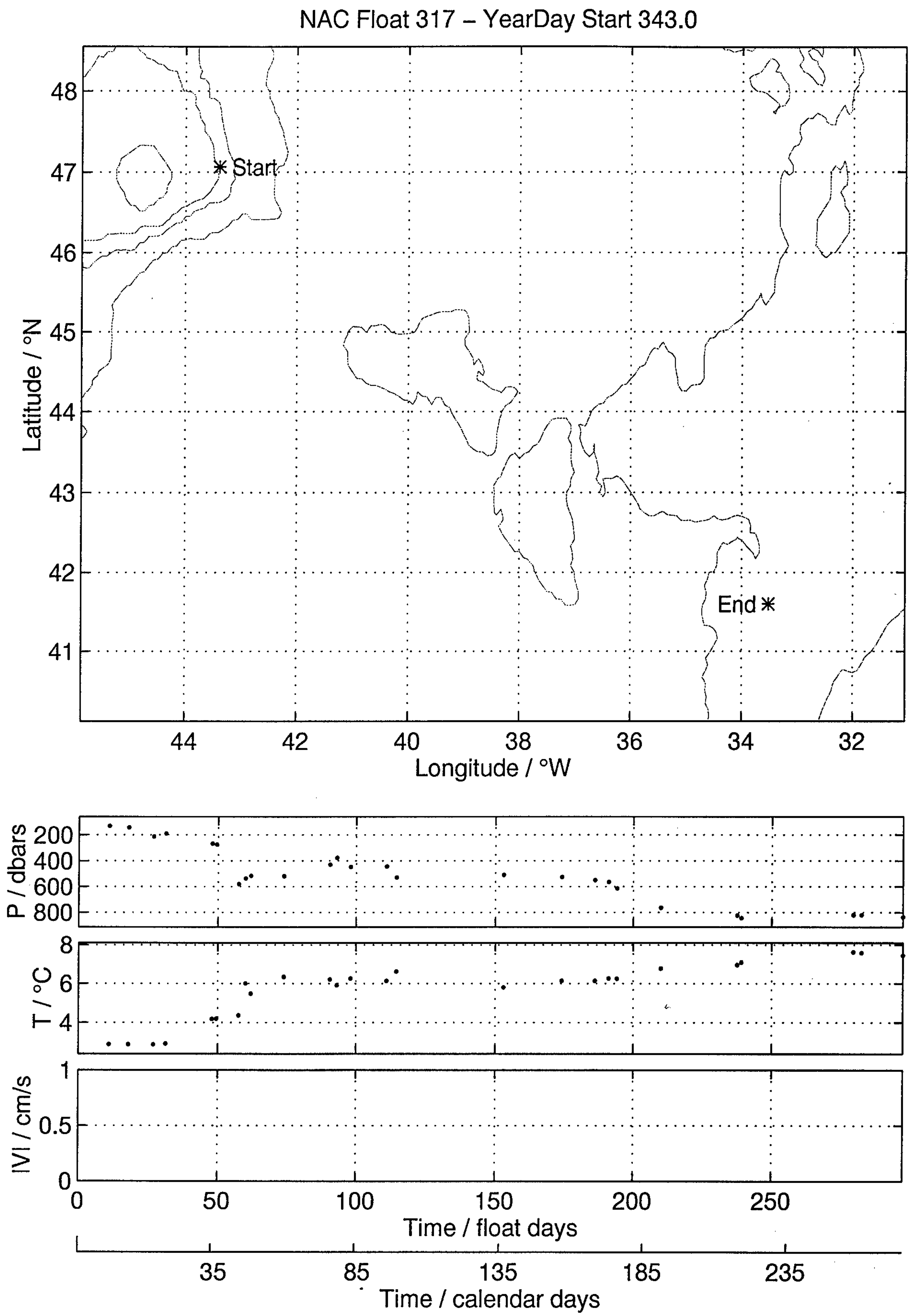

NAC Float 315 – YearDay Start 336.0
Latitude / °N
56
54
52
50
48
46
44
55
50
45
40
35
Longitude / °W
0
50
100
150
200
250
P / dbars
200
400
T / °C
6
4
2
|V| / cm/s
50
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days


NAC Float 315 – Vocha Data
P / dbars
0
100
200
300
400
500
delta P / dbars
200
100
0
−100
−200
T / °C
7
6
5
4
3
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

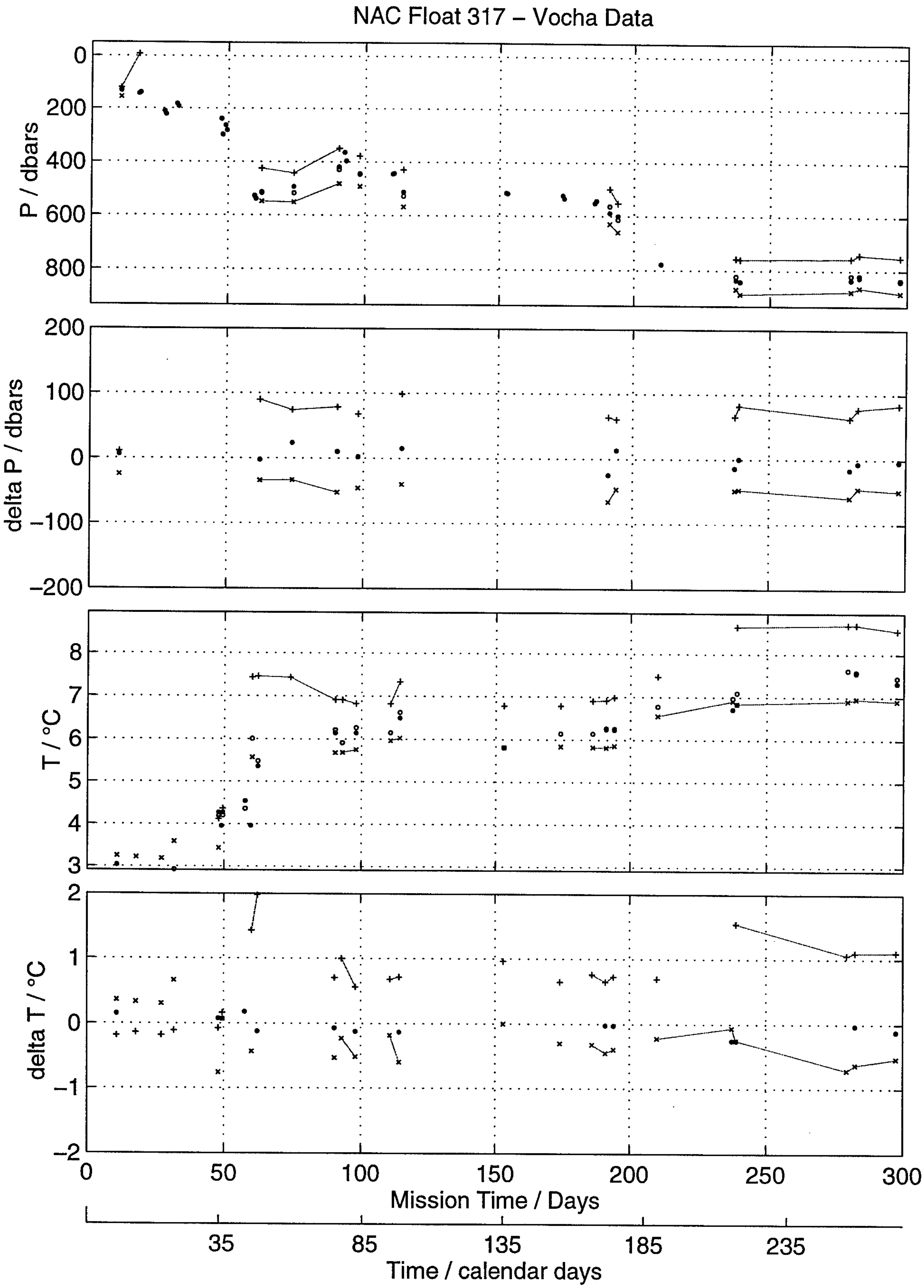

NAC Float 316 – YearDay Start 340.0
Latitude / °N
Longitude / °W
51
50
49
48
47
46
45
44
43
42
45
40
35
30
100
50
150
200
250
0
P / dbars
0
200
400
600
800
T / °C
20
15
10
|V| / cm/s
100
50
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days



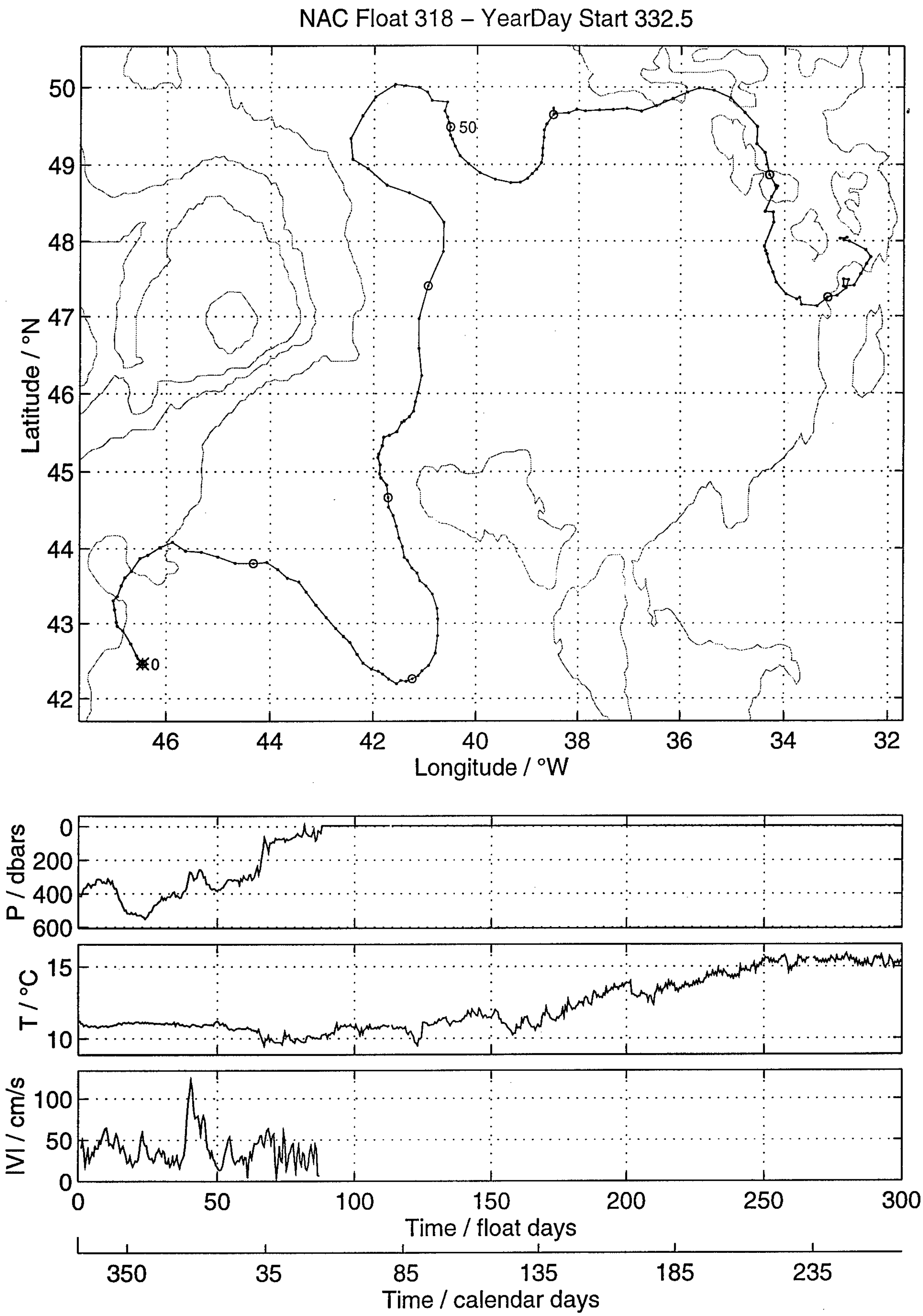
NAC Float 316 – Vocha Data
P / dbars
0
200
400
600
800
delta P / dbars
200
100
0
−100
−200
T / °C
20
15
10
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days



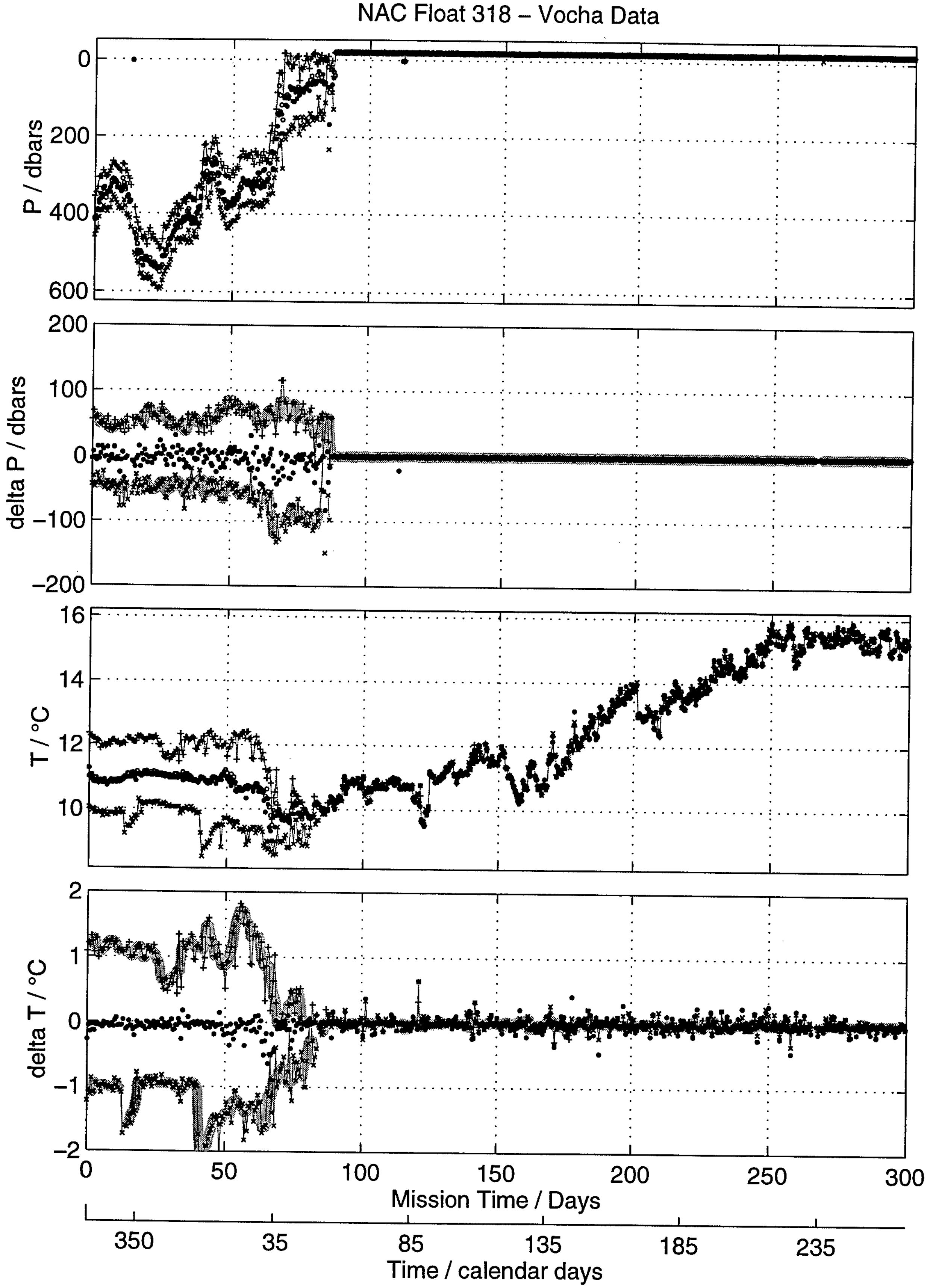
NAC Float 317 – YearDay Start 343.0
Start
End
Latitude / °N
Longitude / °W
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days



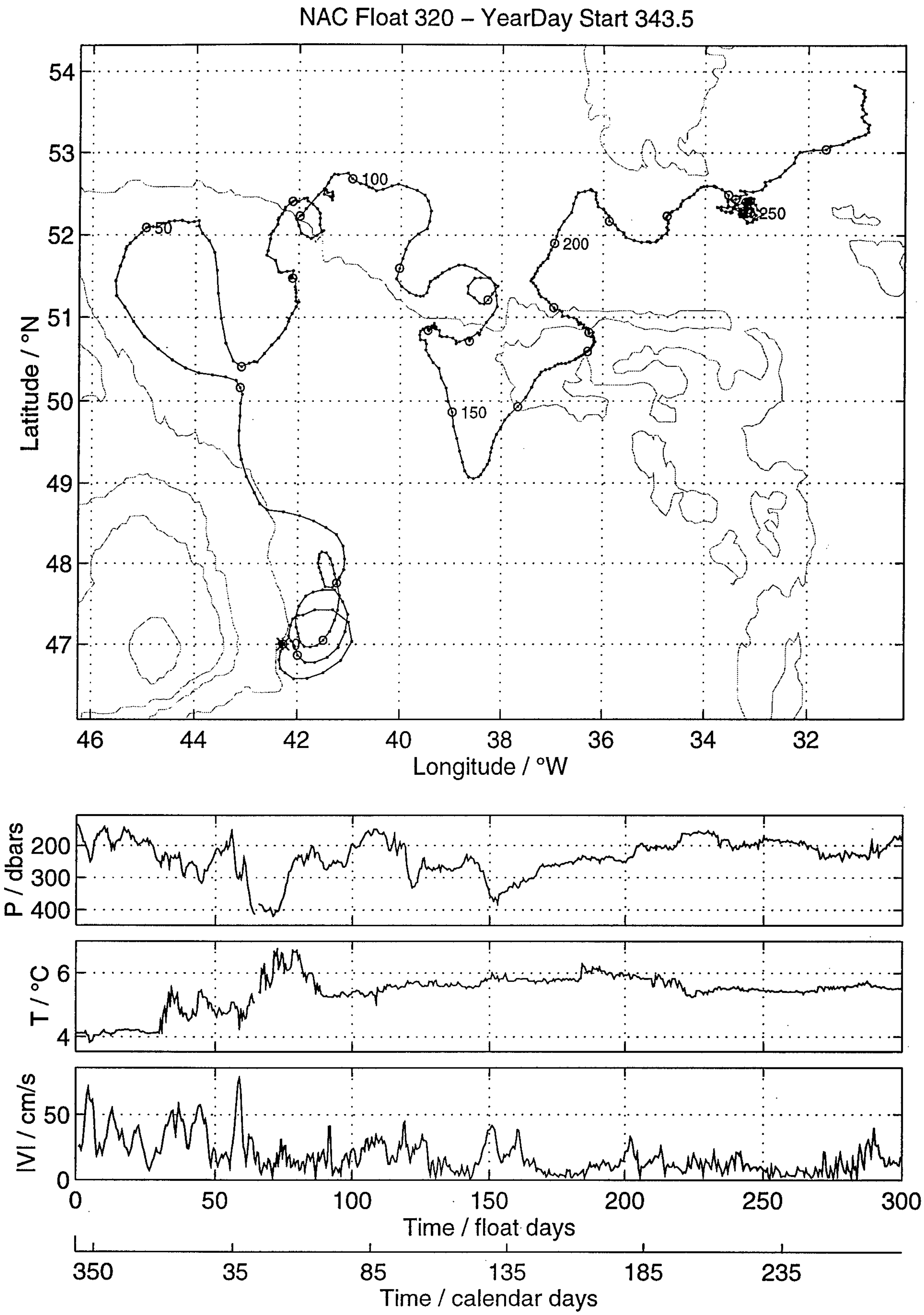
NAC Float 317 – Vocha Data
P / dbars
0
200
400
600
800
delta P / dbars
200
100
0
−100
−200
T / °C
8
7
6
5
4
3
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
35
85
135
185
235
Time / calendar days



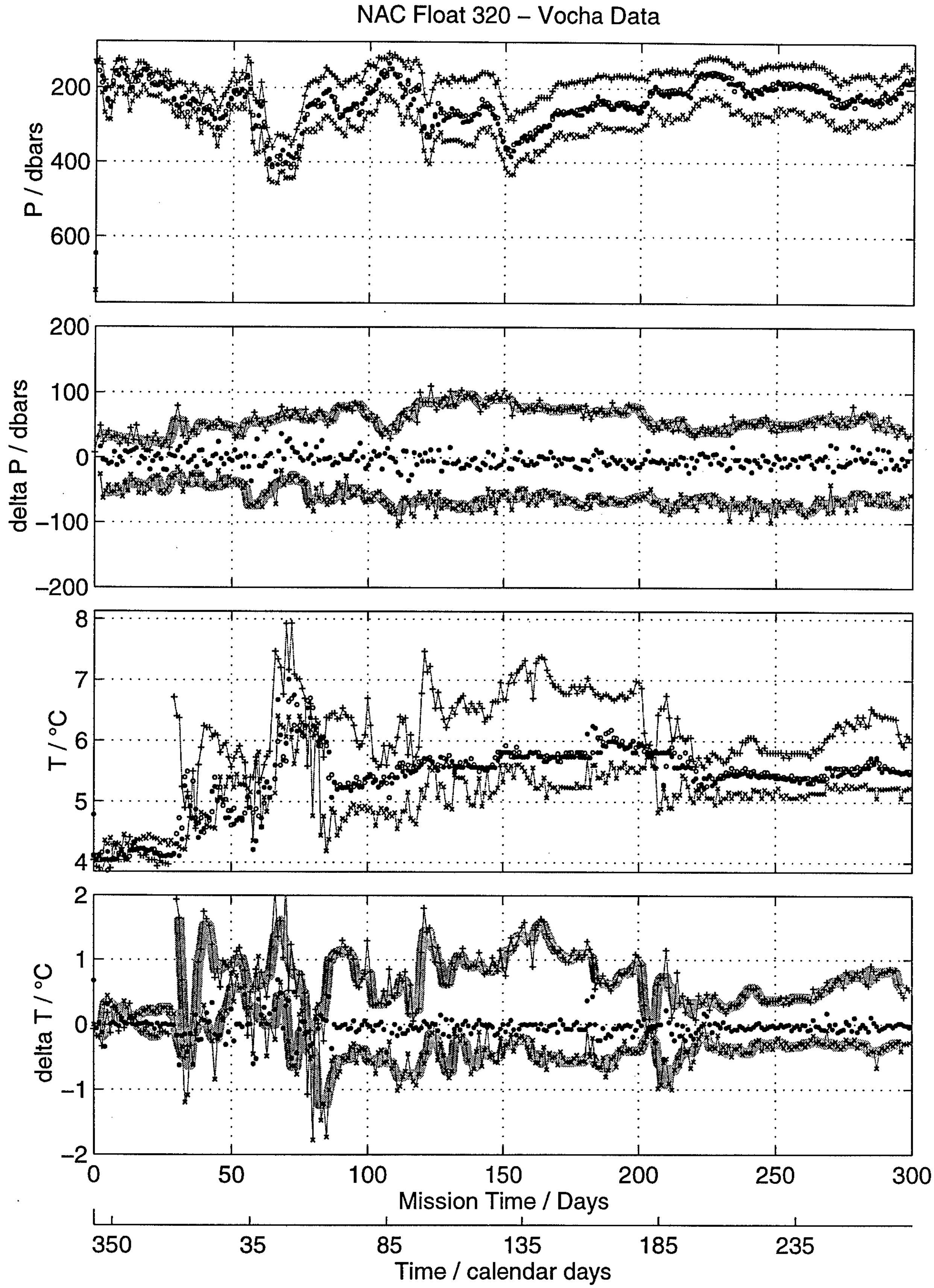
NAC Float 318 – YearDay Start 332.5
50
49
48
47
46
45
44
43
42
Latitude / °N
50
0
46
44
42
40
38
36
34
32
Longitude / °W
P / dbars
0
200
400
600
T / °C
15
10
|V| / cm/s
100
50
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days



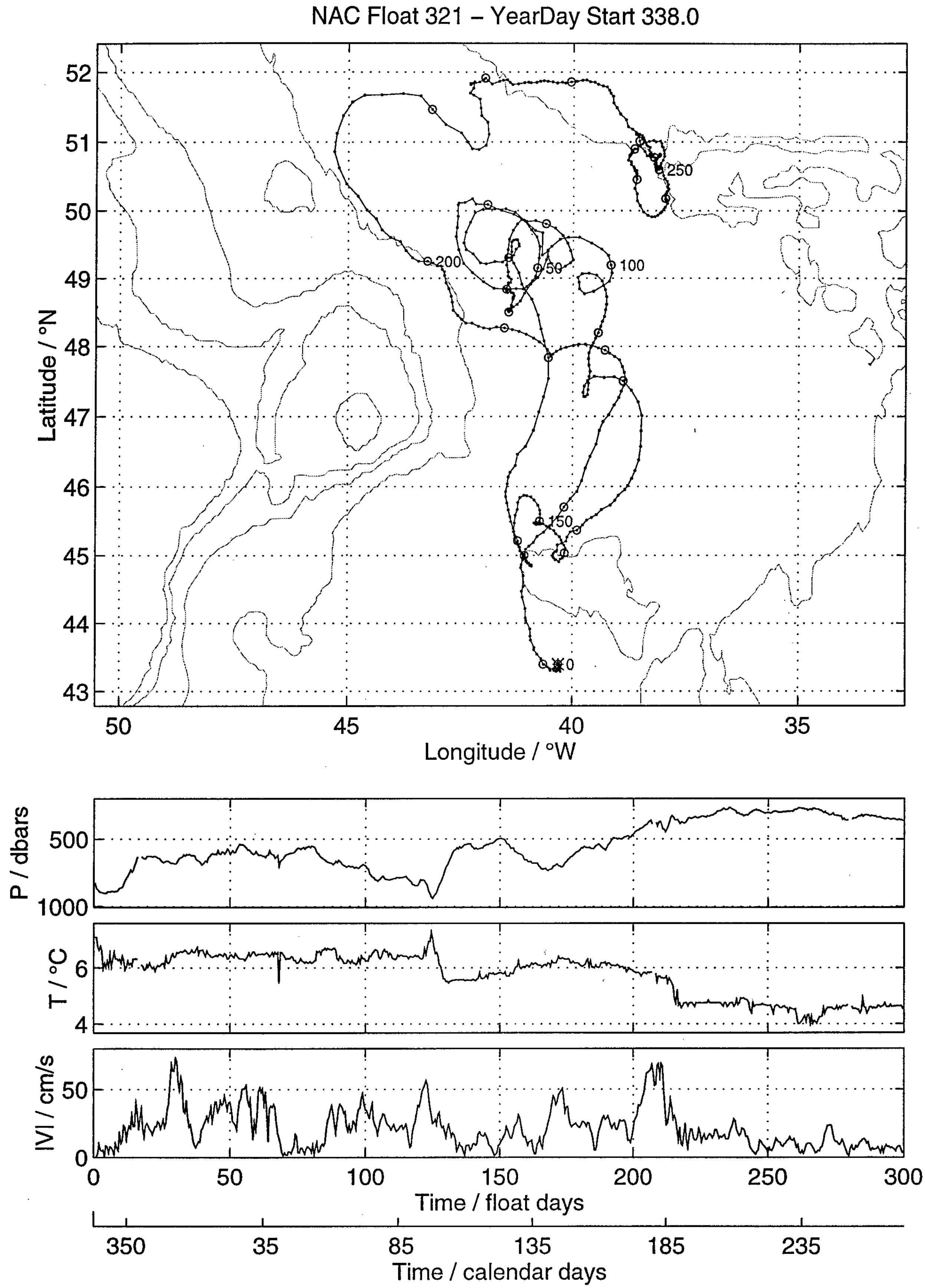
NAC Float 318 – Vocha Data
P / dbars
0
200
400
600
delta P / dbars
200
100
0
−100
−200
T / °C
16
14
12
10
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

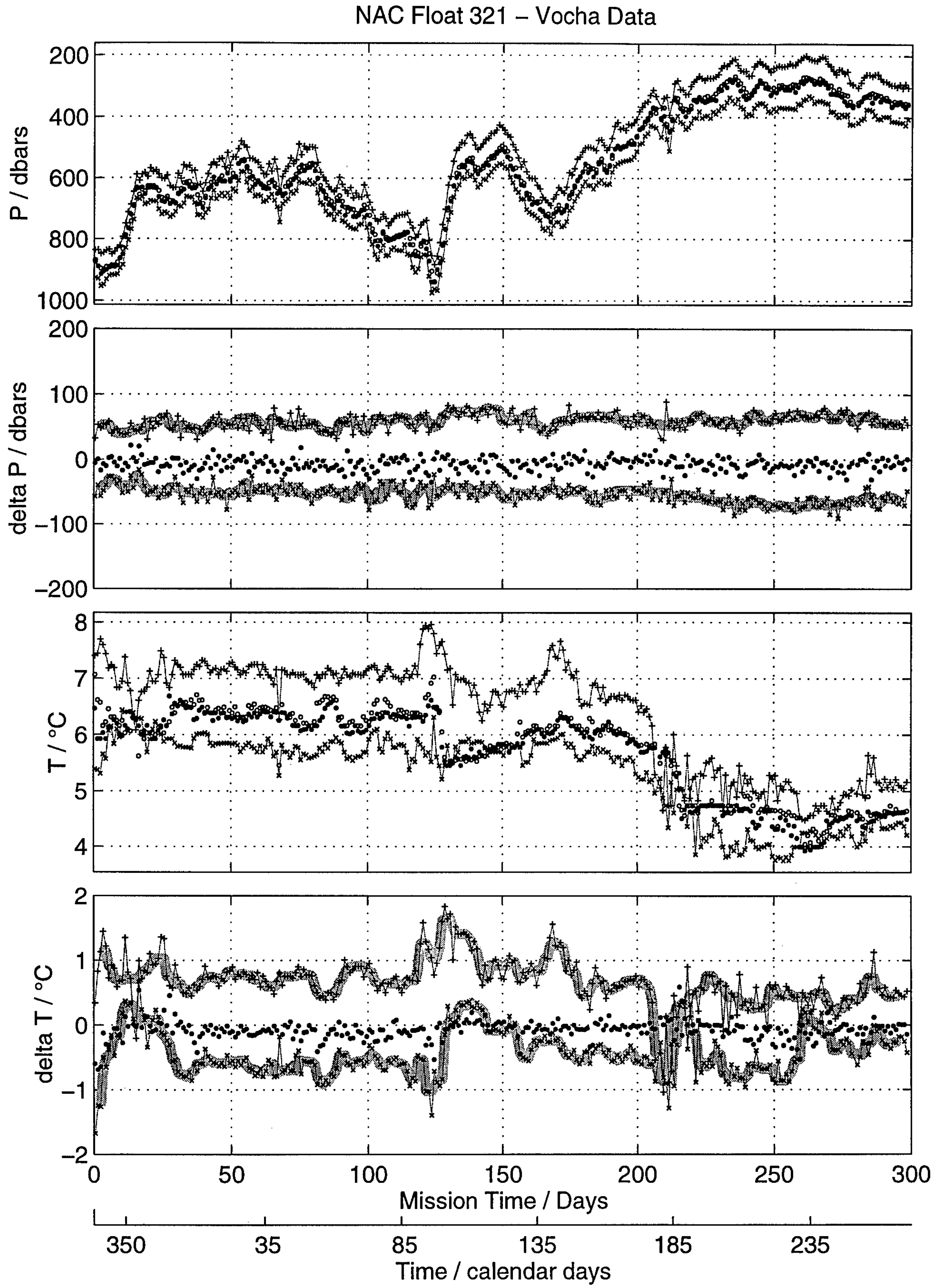


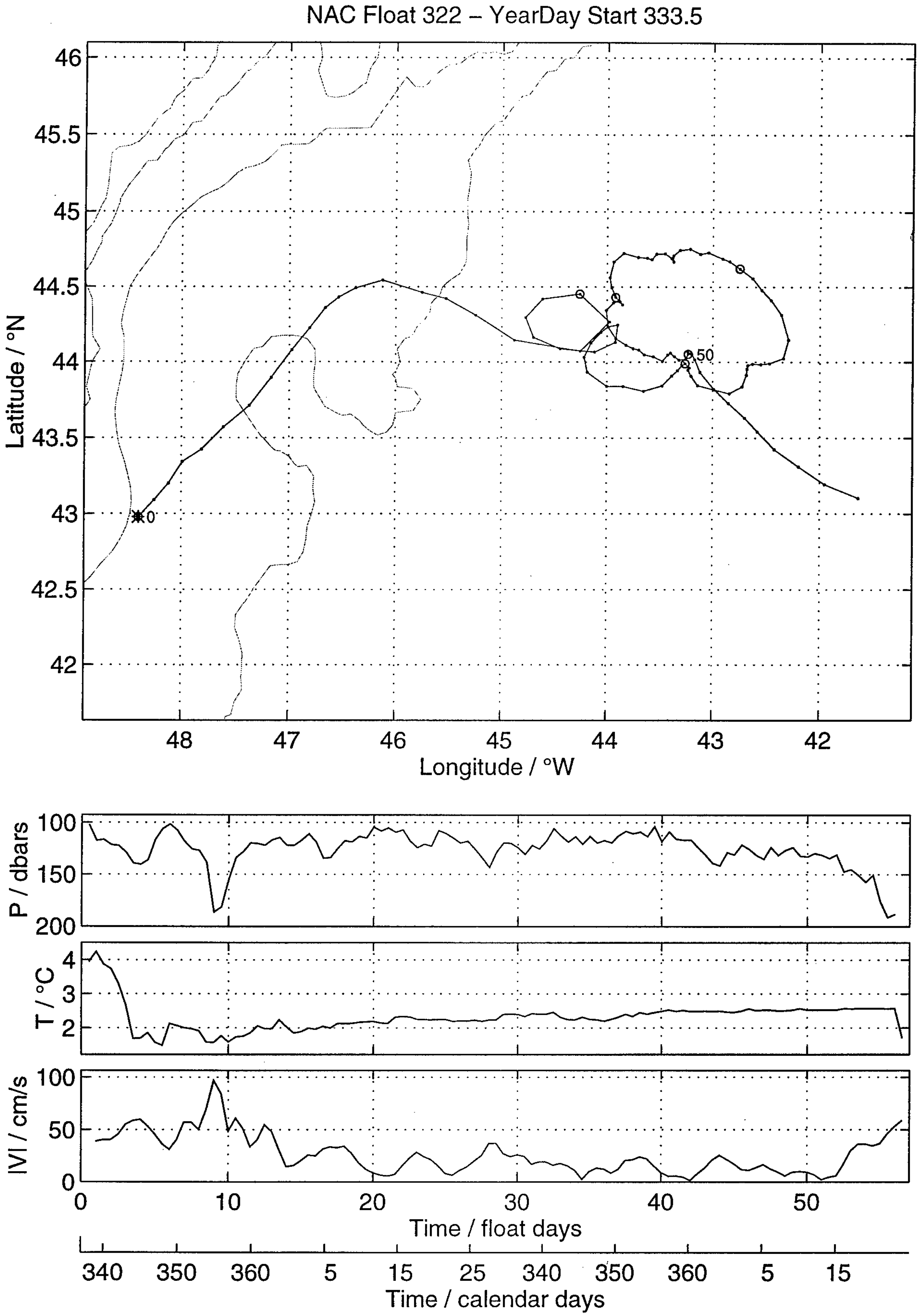
NAC Float 320 – YearDay Start 343.5
Latitude / °N
Longitude / °W
50
100
150
200
250
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

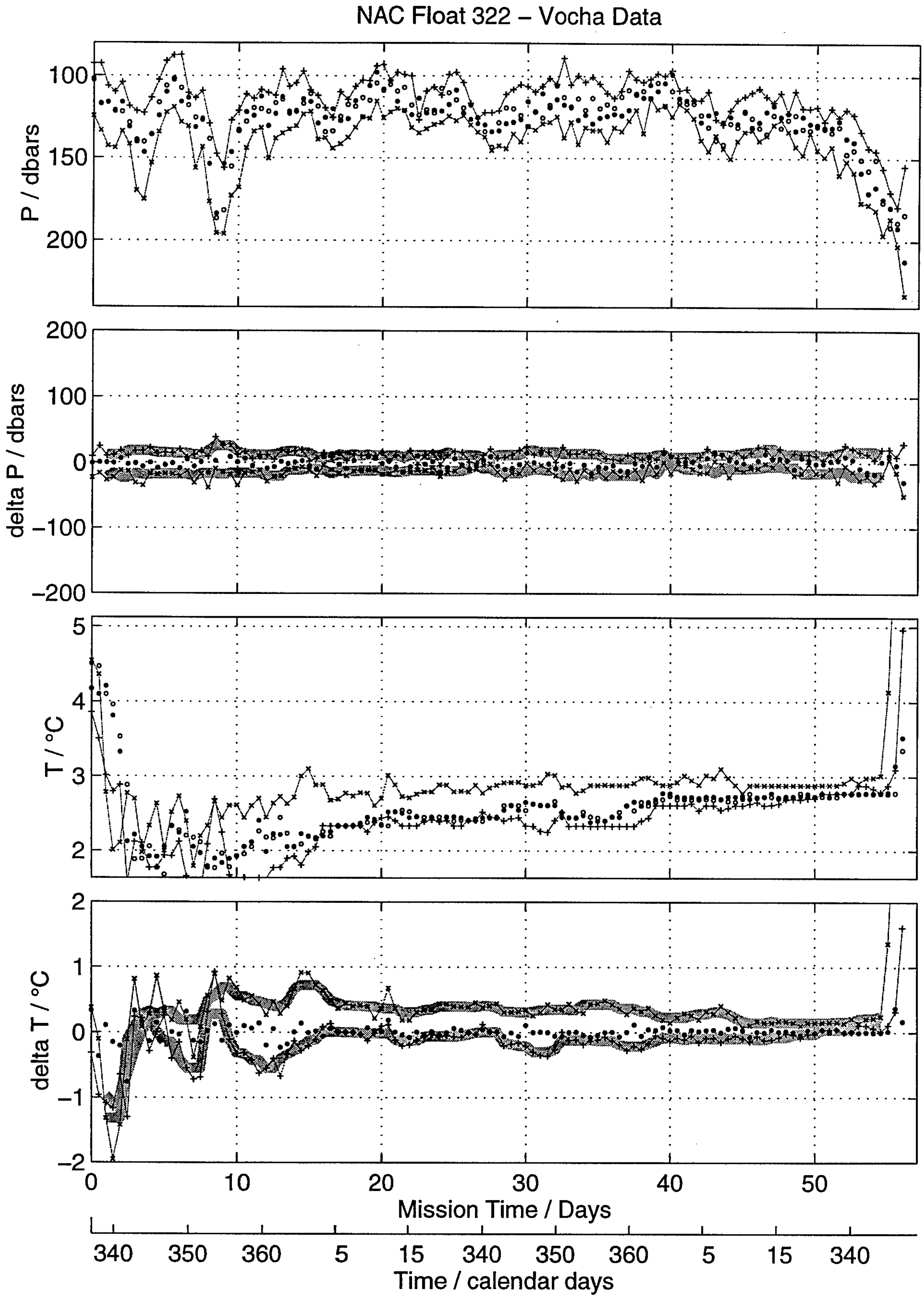


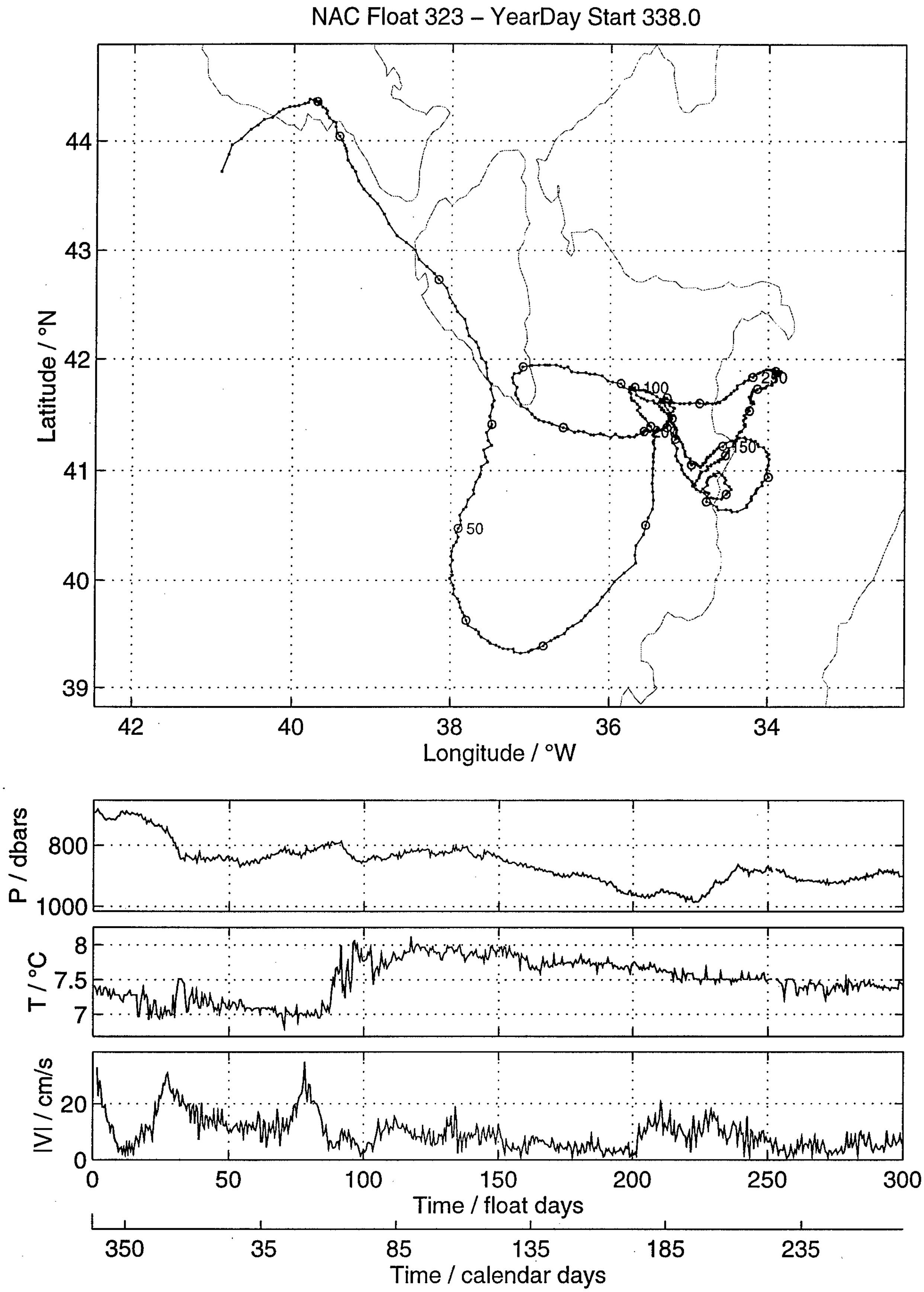
NAC Float 320 – Vocha Data
P / dbars
200
400
600
delta P / dbars
200
100
0
−100
−200
T / °C
8
7
6
5
4
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

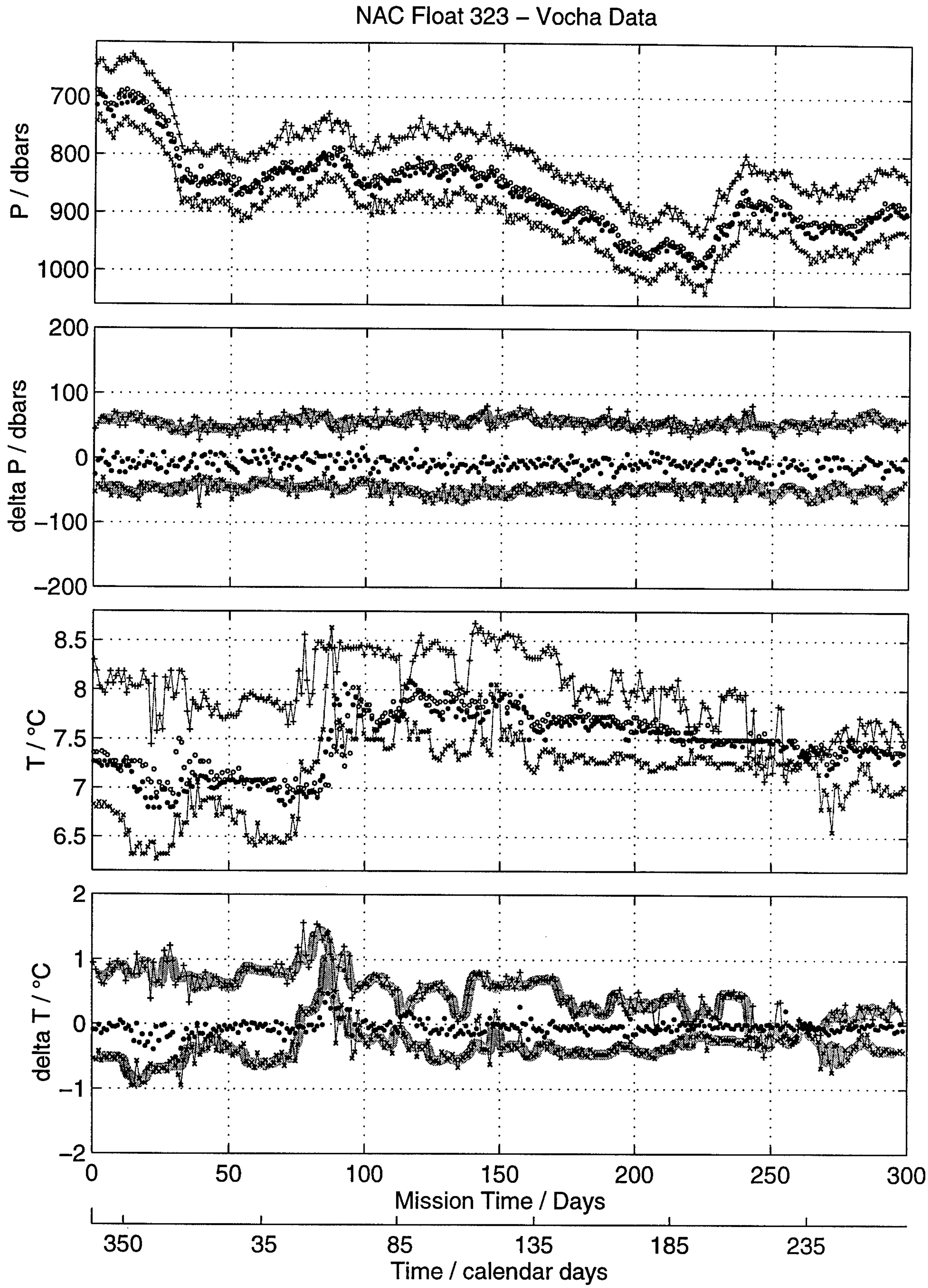

NAC Float 321 – YearDay Start 338.0
Latitude / °N
Longitude / °W
0
50
100
150
200
250
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

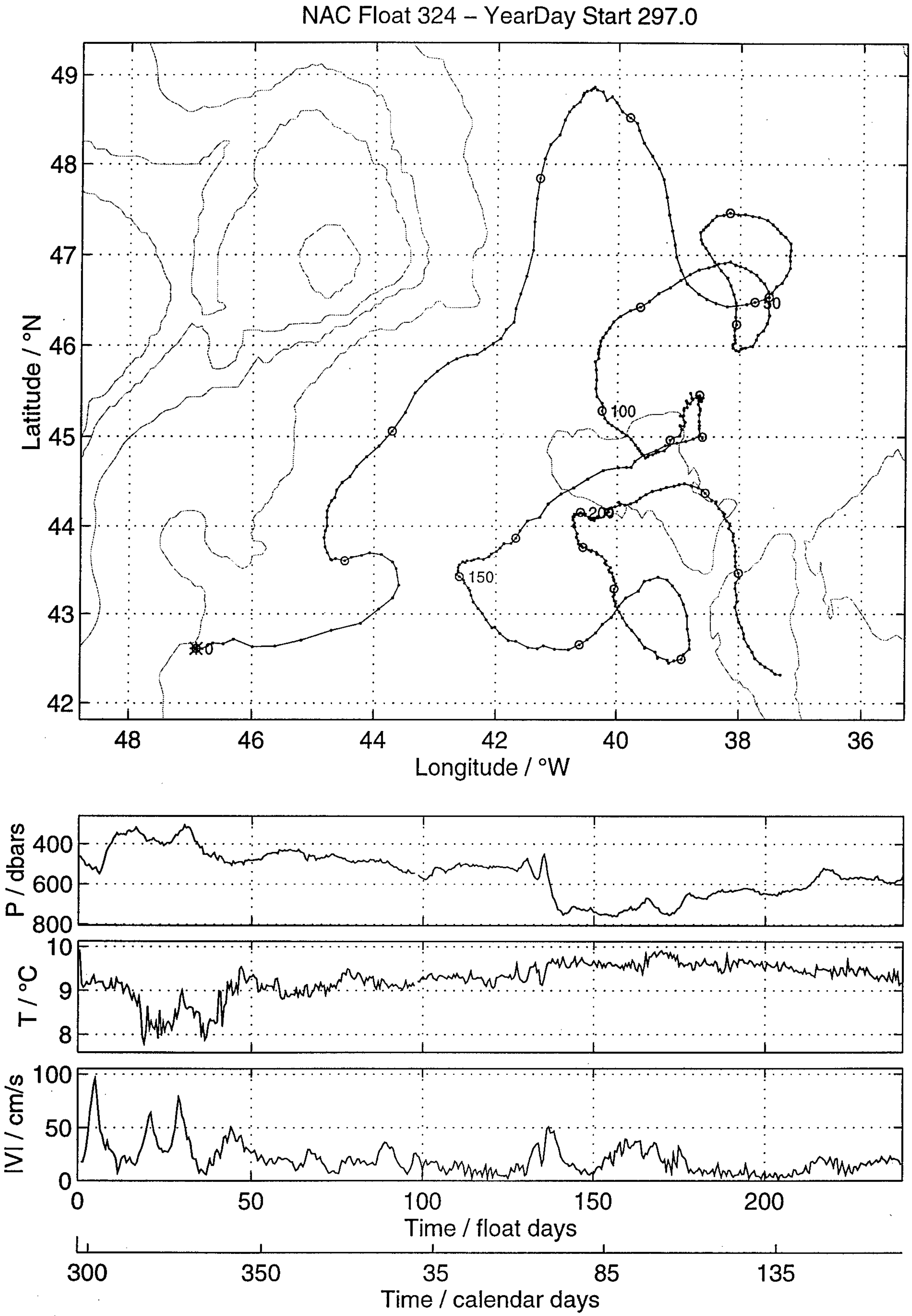

NAC Float 321 – Vocha Data
P / dbars
200
400
600
800
1000
delta P / dbars
200
100
0
−100
−200
T / °C
8
7
6
5
4
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days


NAC Float 322 – YearDay Start 333.5
Latitude / °N
Longitude / °W
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

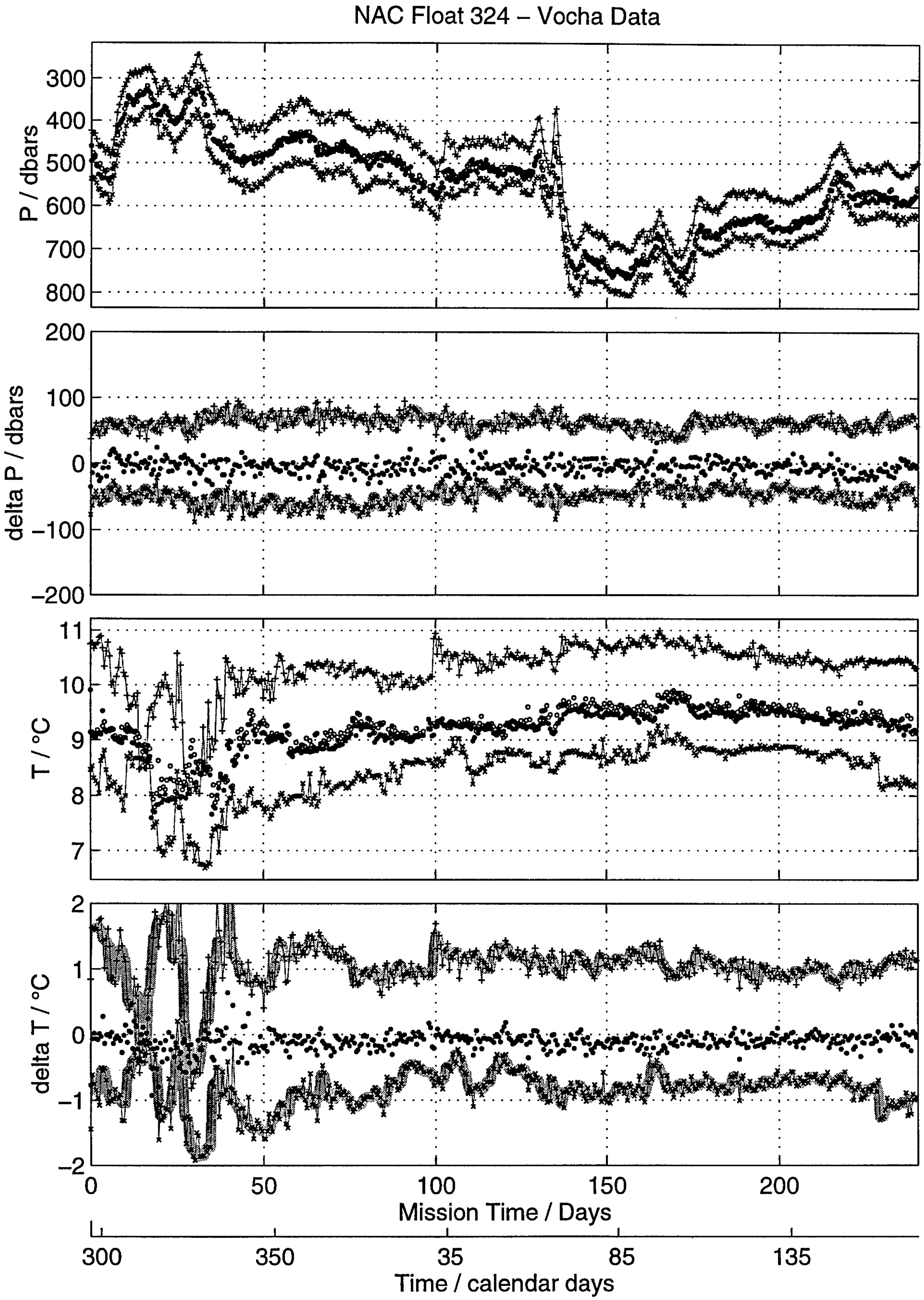

NAC Float 322 – Vocha Data
P / dbars
100
150
200
delta P / dbars
200
100
0
−100
−200
T / °C
5
4
3
2
delta T / °C
2
1
0
−1
−2
0
10
20
30
40
50
Mission Time / Days
340
350
360
5
15
340
350
360
5
15
340
Time / calendar days

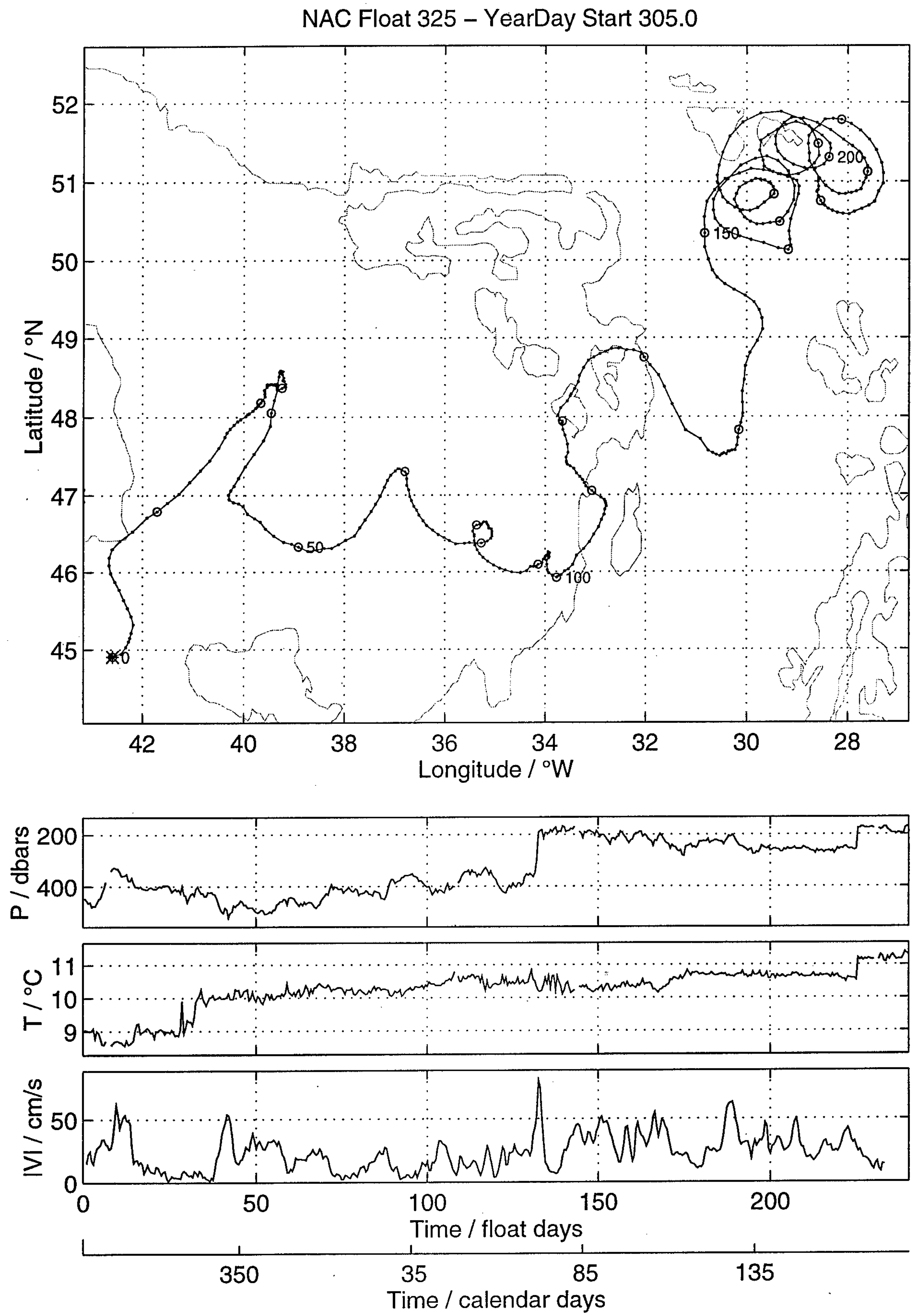

NAC Float 323 – YearDay Start 338.0
Latitude / °N
Longitude / °W
44
43
42
41
40
39
42
40
38
36
34
50
100
150
200
250
P / dbars
800
1000
T / °C
8
7.5
7
|V| / cm/s
20
0
0
50
100
150
200
250
300
Time / float days
350
35
85
135
185
235
Time / calendar days

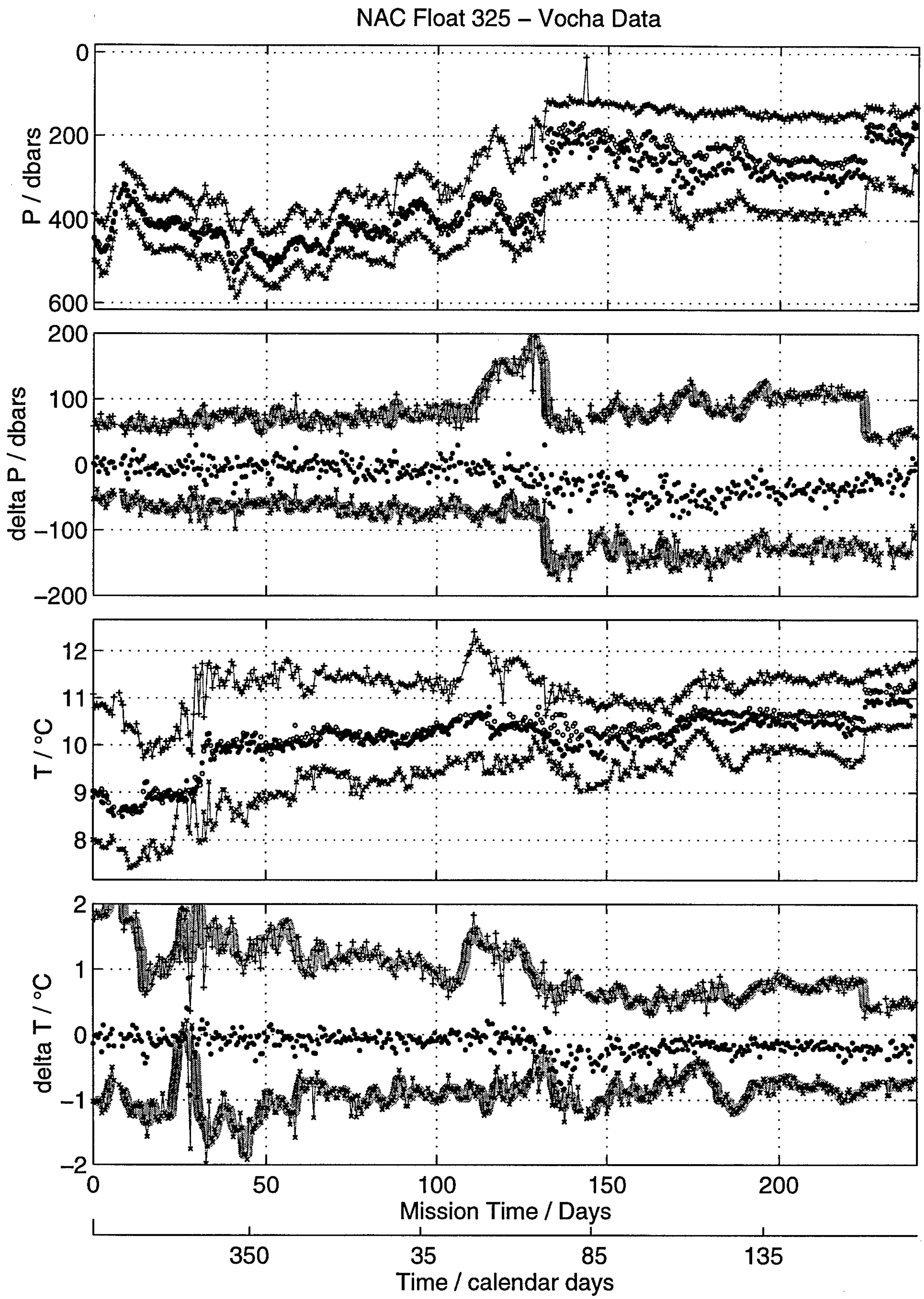

NAC Float 323 – Vocha Data
P / dbars
700
800
900
1000
delta P / dbars
200
100
0
−100
−200
T / °C
8.5
8
7.5
7
6.5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
250
300
Mission Time / Days
350
35
85
135
185
235
Time / calendar days

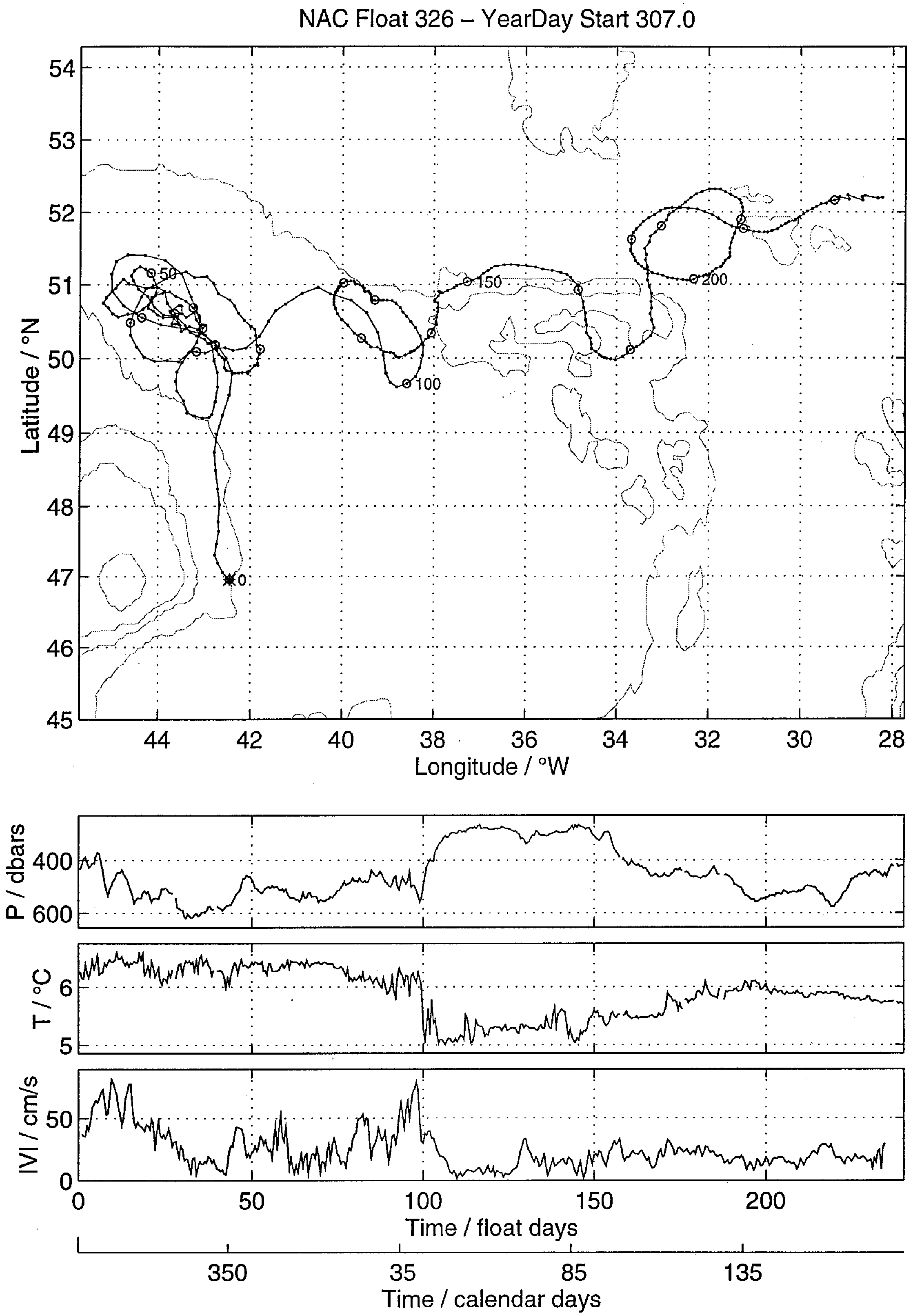


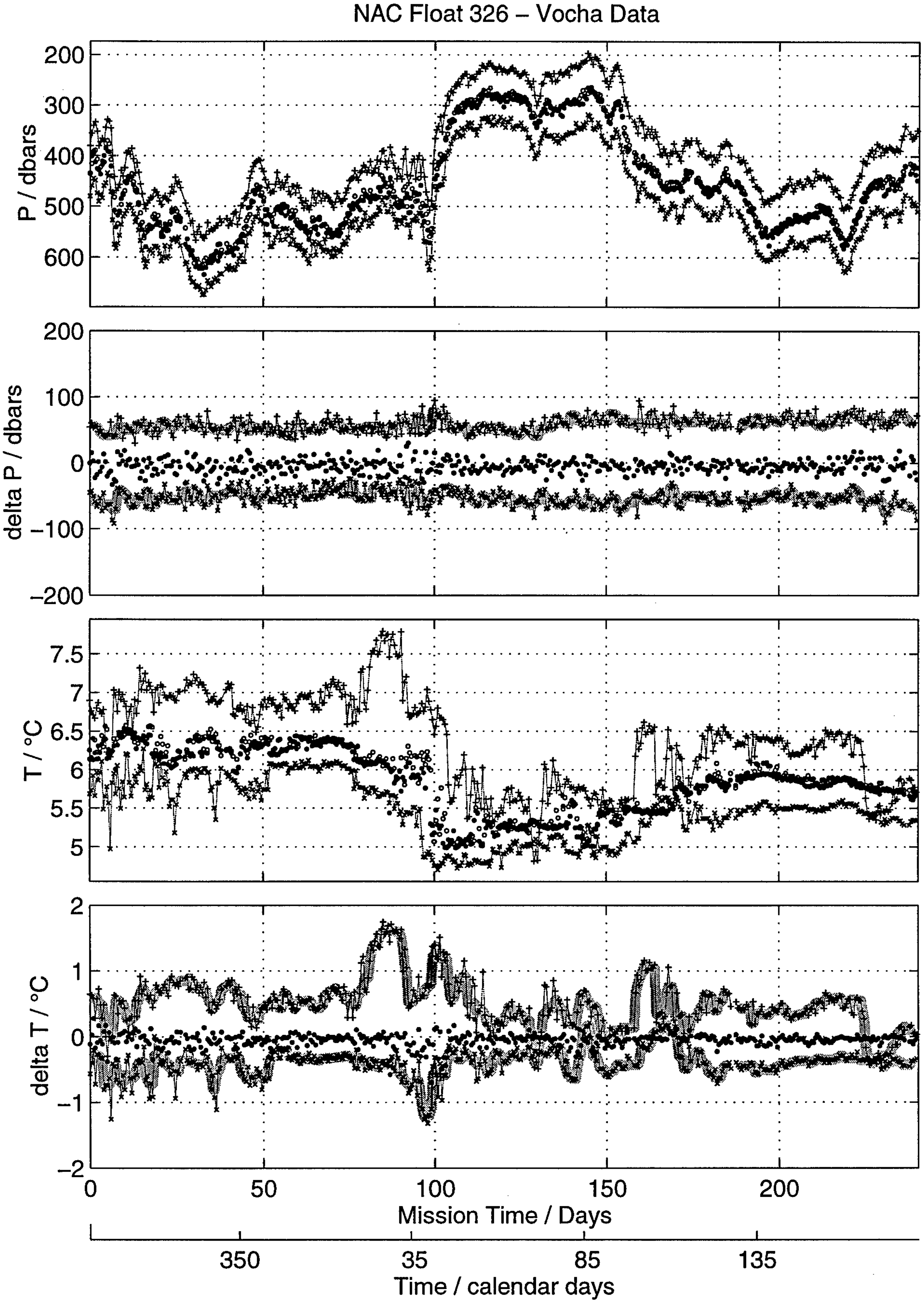
NAC Float 324 – YearDay Start 297.0
Latitude / °N
Longitude / °W
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days


NAC Float 324 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days
0
50
100
150
200
300
350
35
85
135

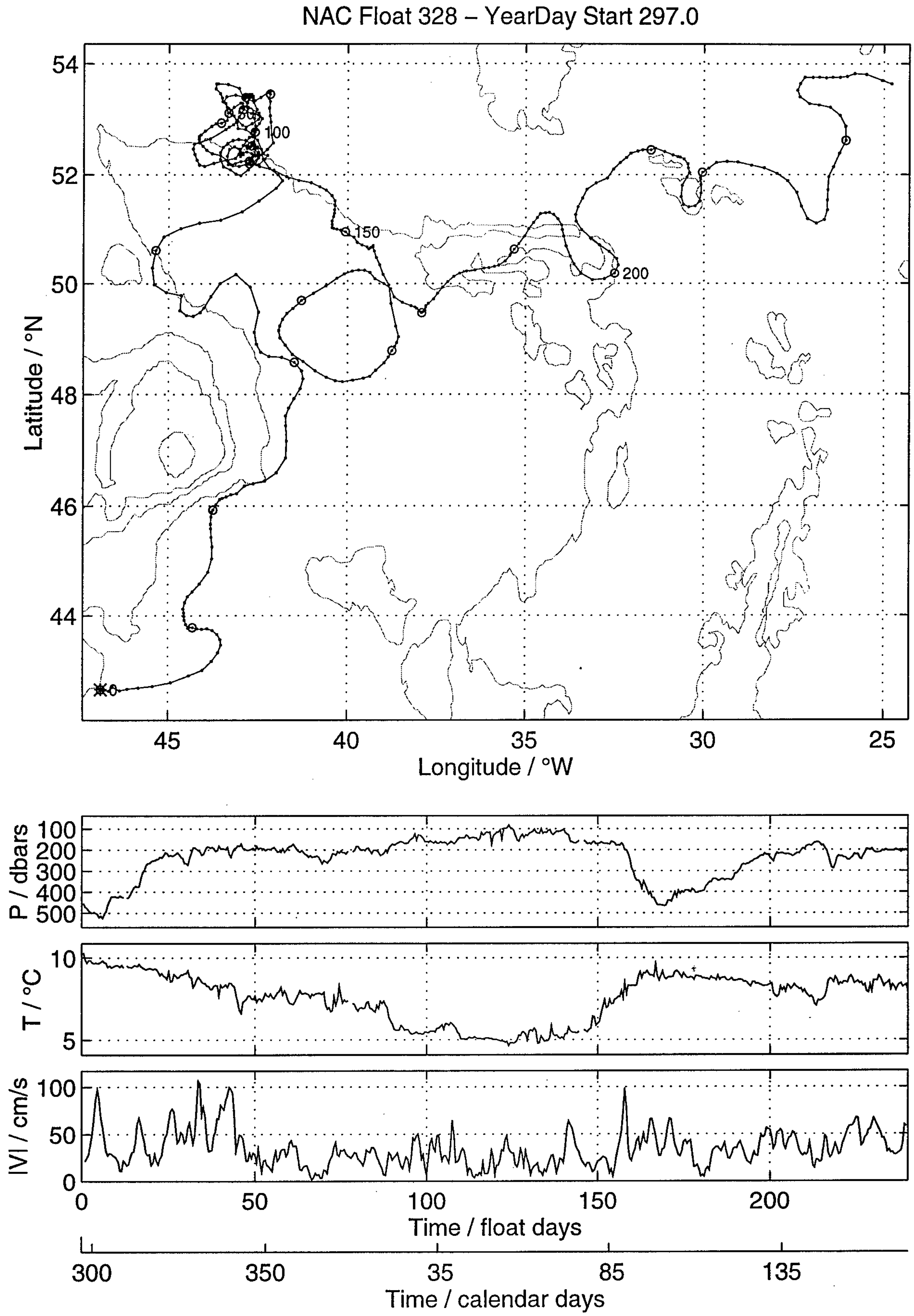

NAC Float 325 – YearDay Start 305.0
Latitude / °N
Longitude / °W
52
51
50
49
48
47
46
45
42
40
38
36
34
32
30
28
0
50
100
150
200
P / dbars
200
400
T / °C
11
10
9
|V| / cm/s
50
0
0
50
100
150
200
Time / float days
350
35
85
135
Time / calendar days


NAC Float 325 – Vocha Data
P / dbars
0
200
400
600
delta P / dbars
200
100
0
−100
−200
T / °C
12
11
10
9
8
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

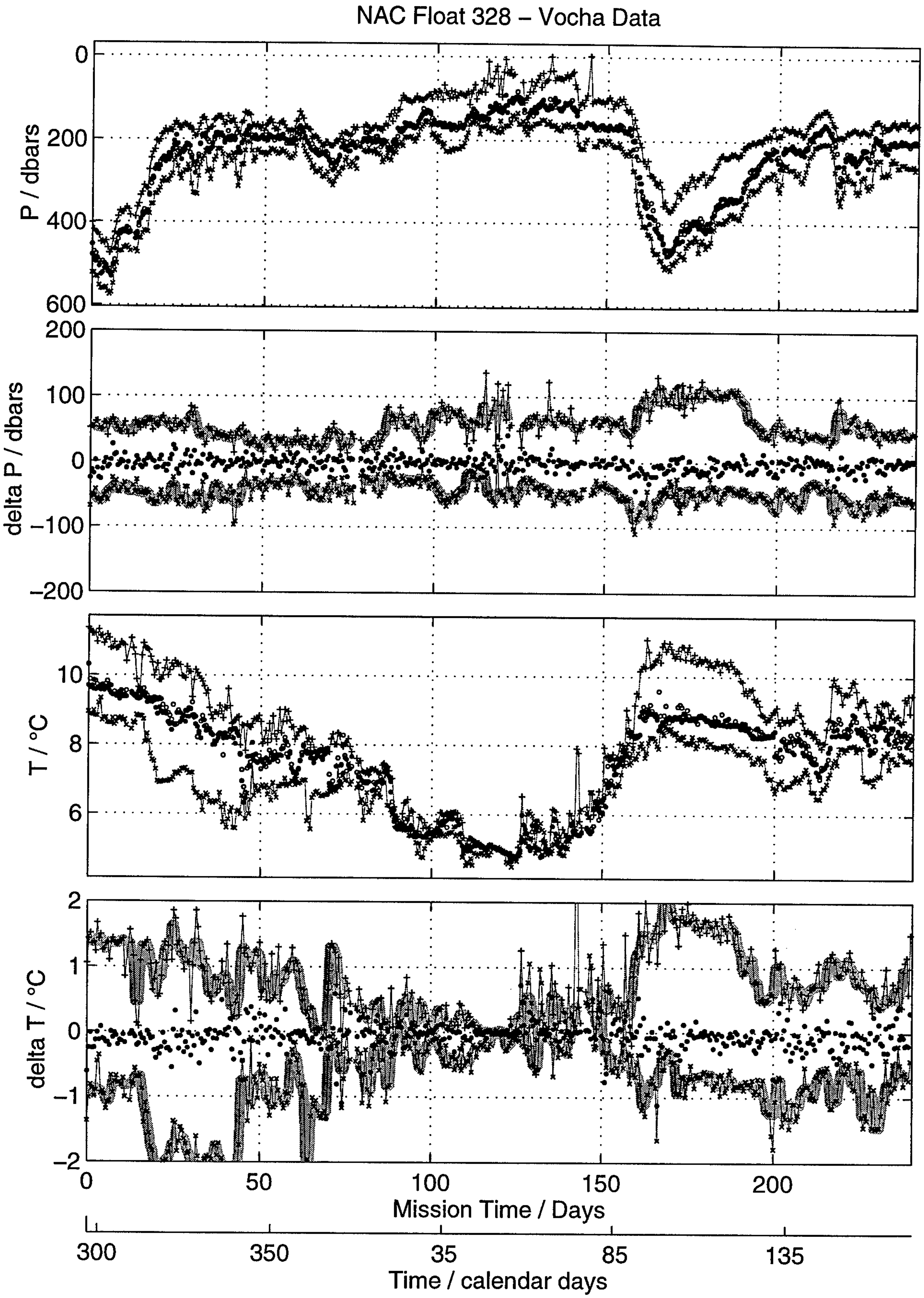

NAC Float 326 – YearDay Start 307.0
Latitude / °N
Longitude / °W
54
53
52
51
50
49
48
47
46
45
44
42
40
38
36
34
32
30
28
0
50
100
150
200
P / dbars
400
600
T / °C
6
5
|V| / cm/s
50
0
0
50
100
150
200
Time / float days
350
35
85
135
Time / calendar days



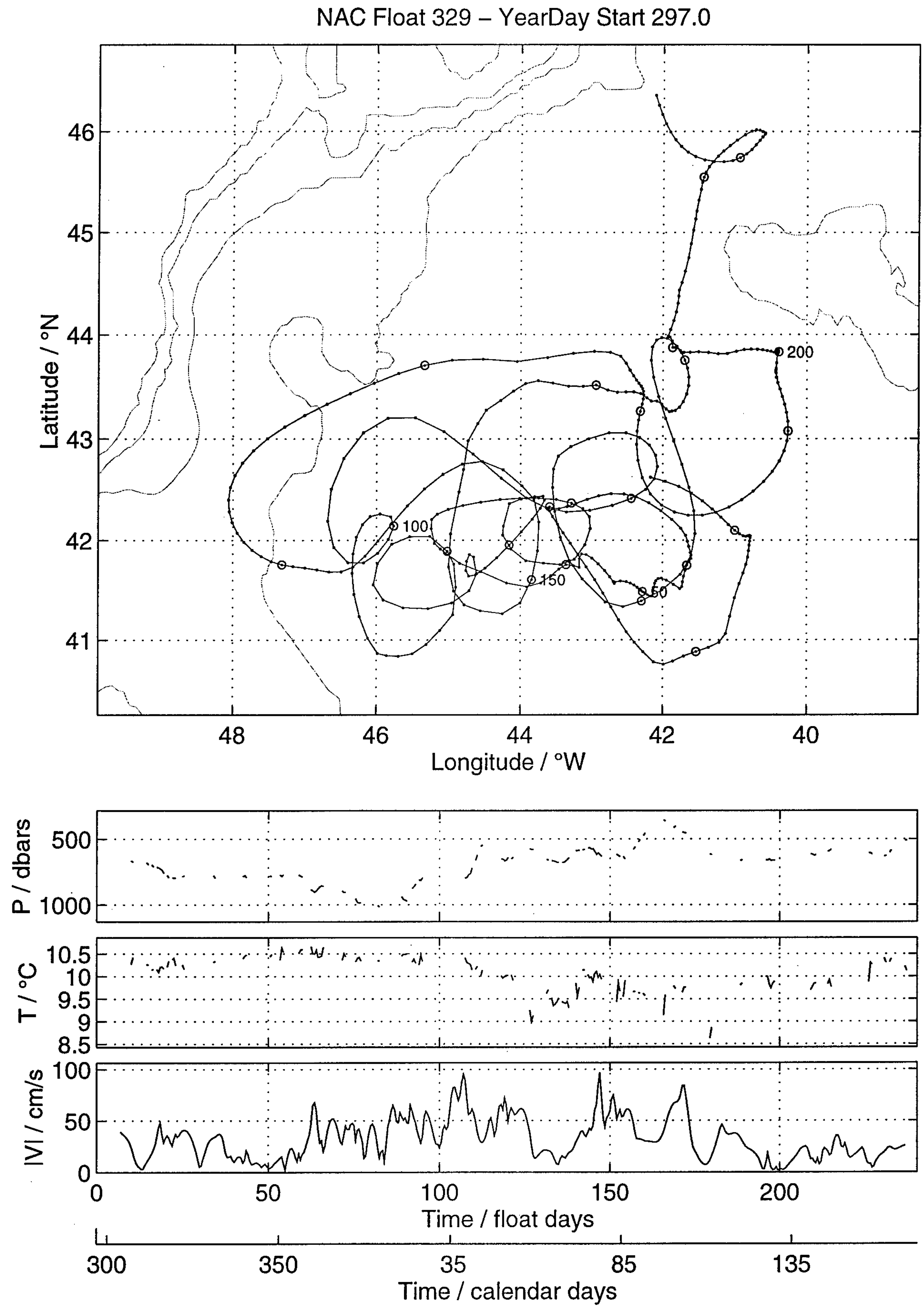
NAC Float 326 – Vocha Data
200
300
400
500
600
P / dbars
200
100
0
−100
−200
delta P / dbars
7.5
7
6.5
6
5.5
5
T / °C
2
1
0
−1
−2
delta T / °C
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

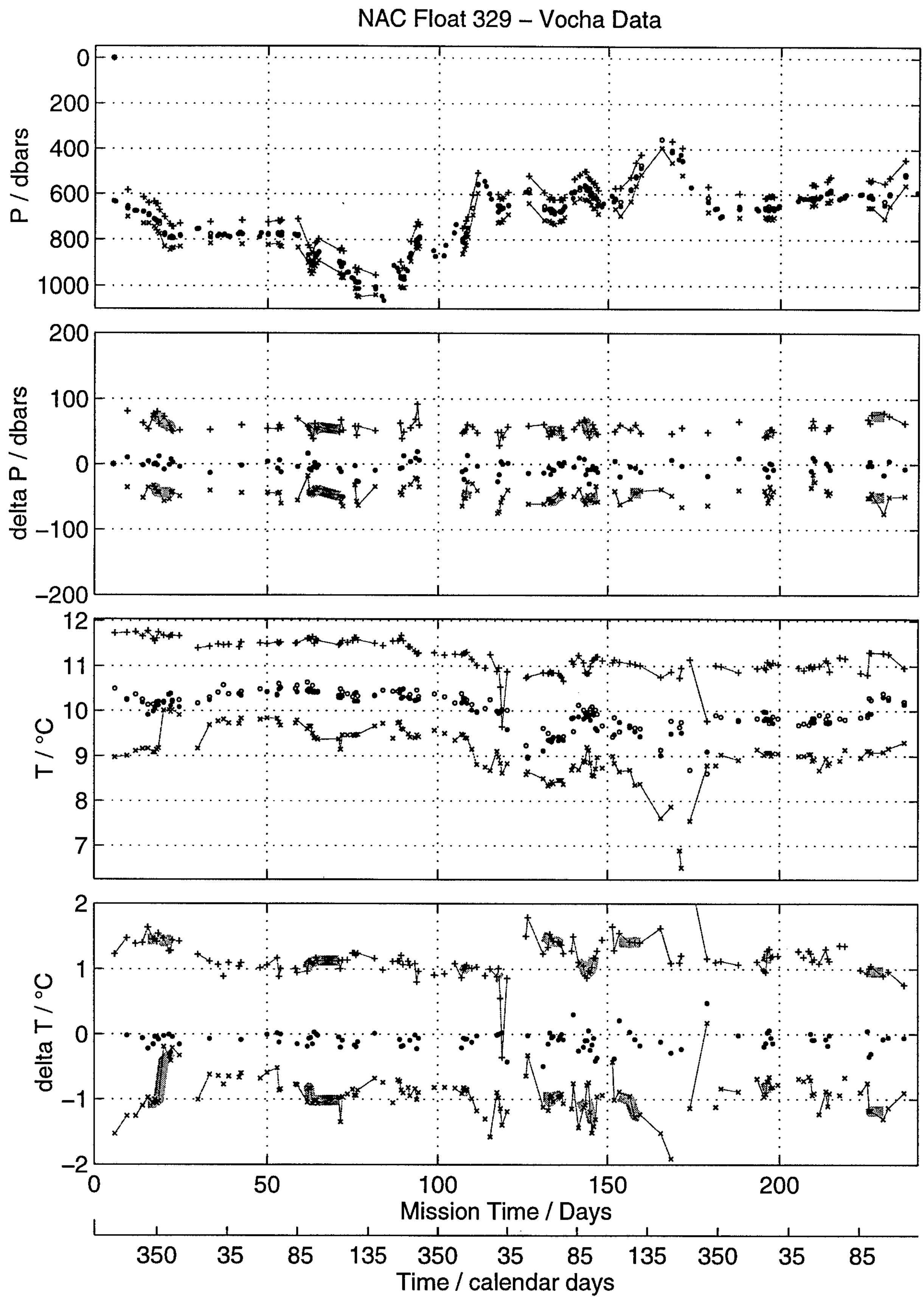


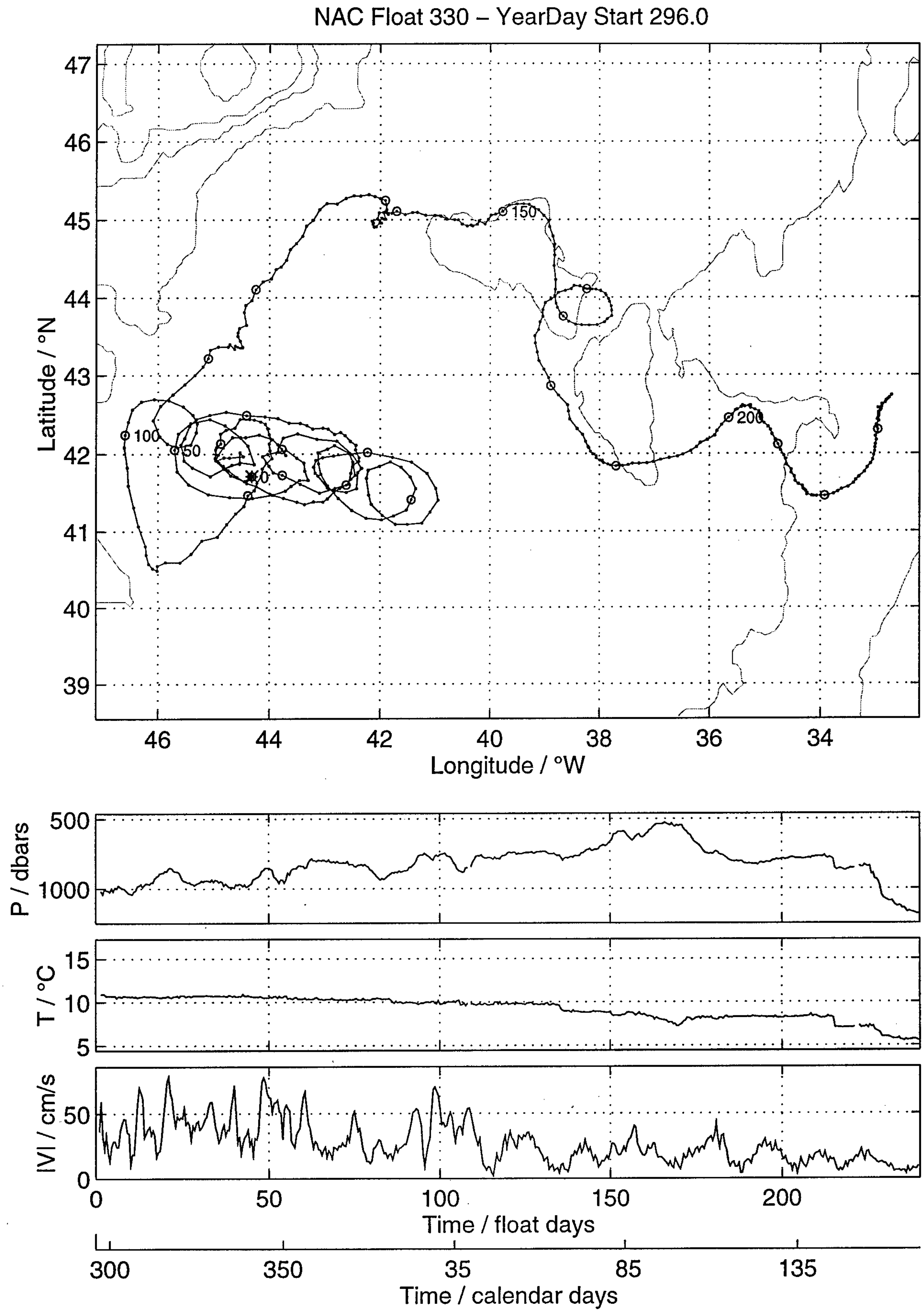
NAC Float 328 – YearDay Start 297.0
54
52
50
48
46
44
45
40
35
30
25
Latitude / °N
Longitude / °W
0
50
100
150
200
P / dbars
100
200
300
400
500
T / °C
10
5
|V| / cm/s
100
50
0
Time / float days
300
350
35
85
135
Time / calendar days

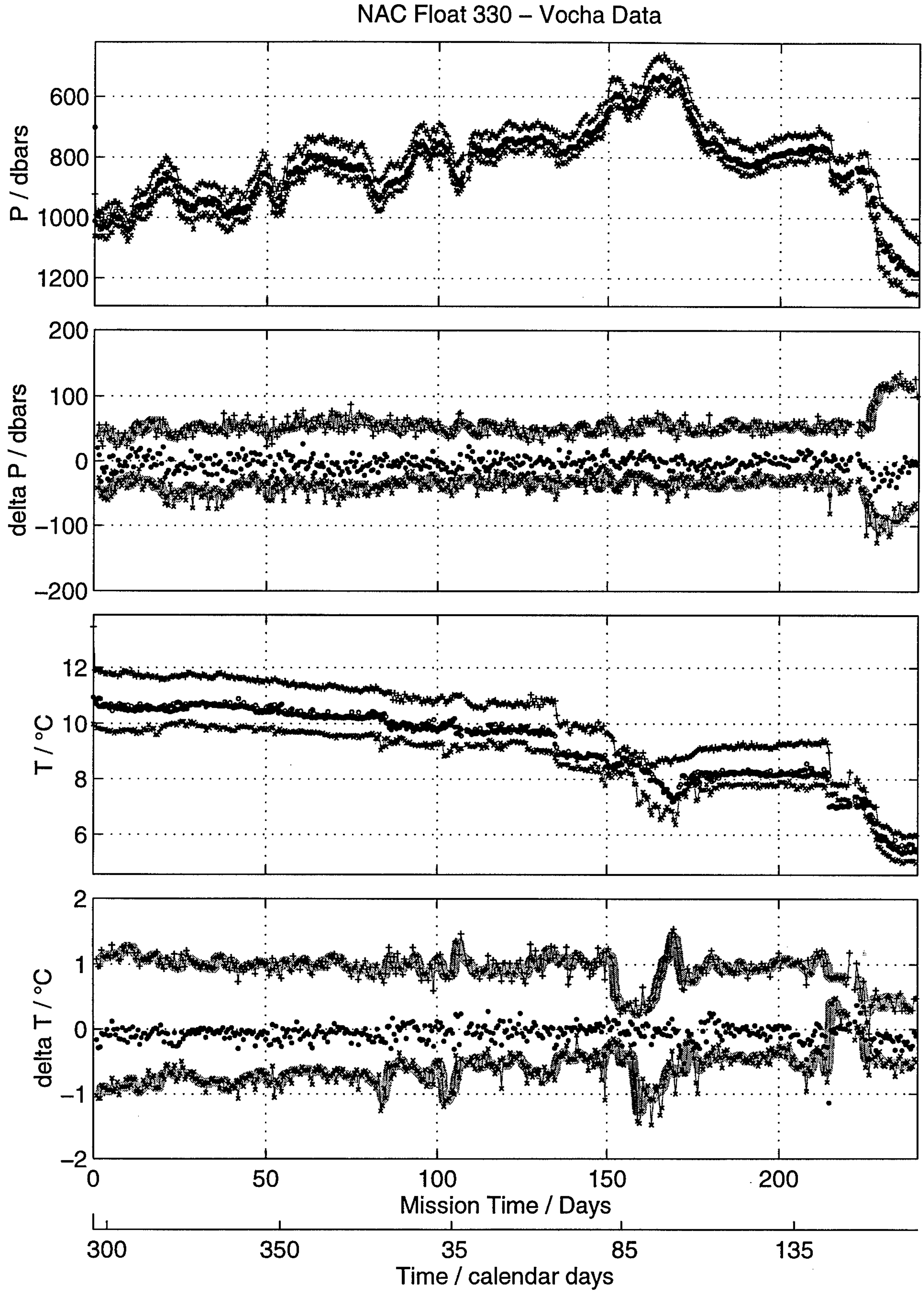


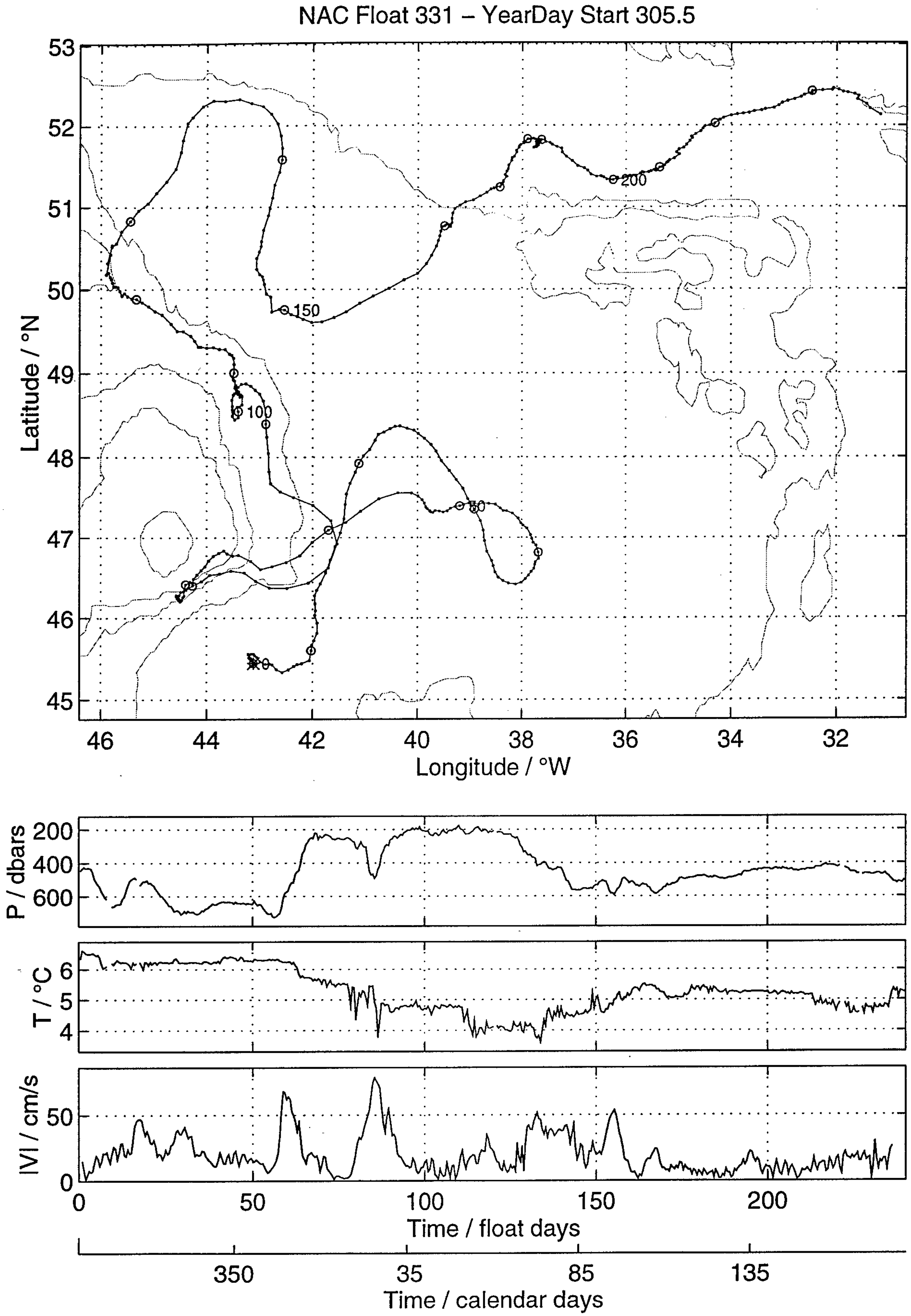
NAC Float 328 – Vocha Data
P / dbars
0
200
400
600
delta P / dbars
200
100
0
−100
−200
T / °C
10
8
6
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
300
350
35
85
135
Time / calendar days

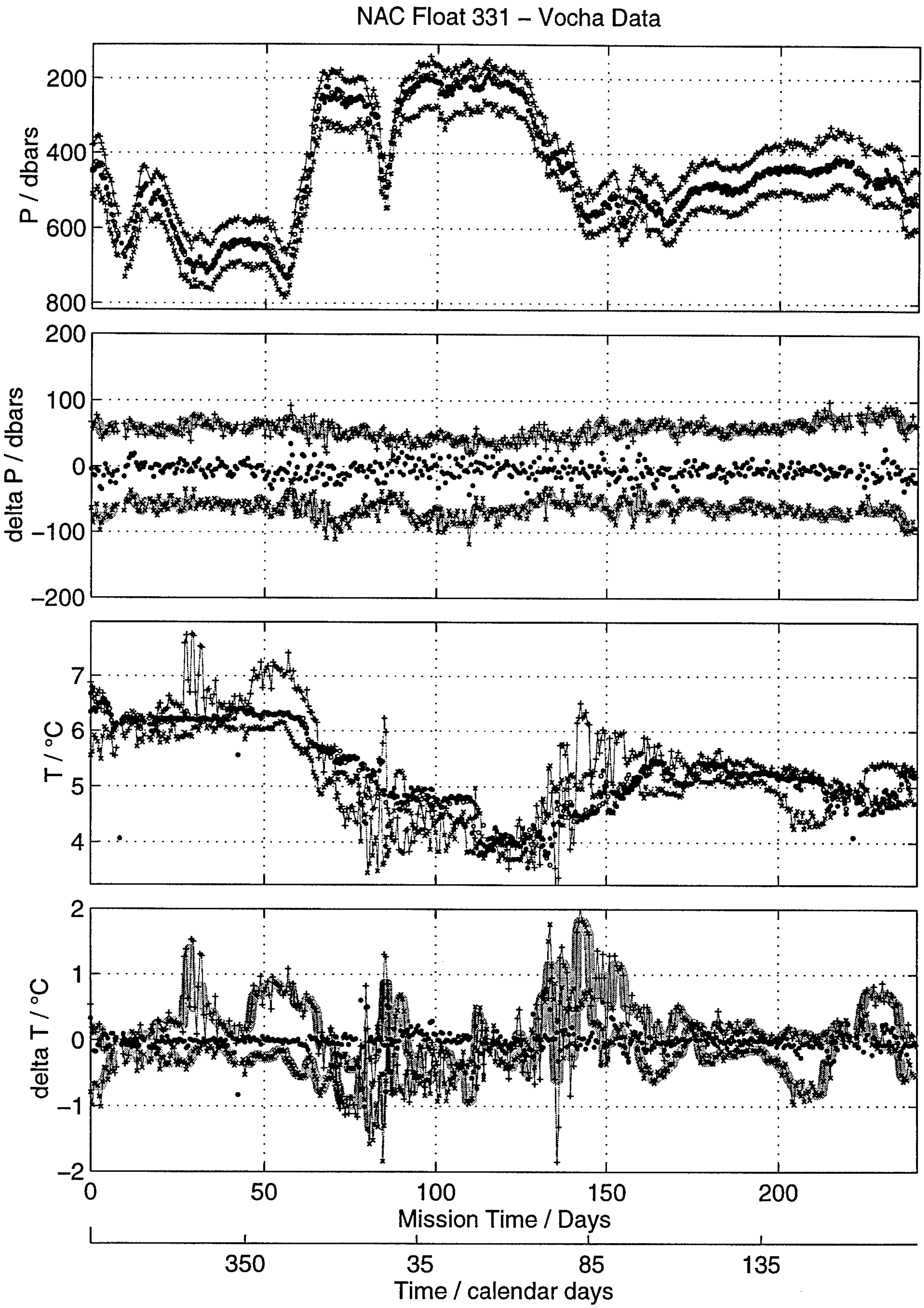

NAC Float 329 – YearDay Start 297.0
Latitude / °N
Longitude / °W
100
150
50
200
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days


NAC Float 329 – Vocha Data
P / dbars
0
200
400
600
800
1000
delta P / dbars
200
100
0
−100
−200
T / °C
12
11
10
9
8
7
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
350
35
85
135
350
35
85
Time / calendar days


NAC Float 330 – YearDay Start 296.0
47
46
45
44
43
42
41
40
39
Latitude / °N
46
44
42
40
38
36
34
Longitude / °W
0
50
100
150
200
500
1000
P / dbars
15
10
5
T / °C
50
0
|V| / cm/s
0
50
100
150
200
Time / float days
300
350
35
85
135
Time / calendar days

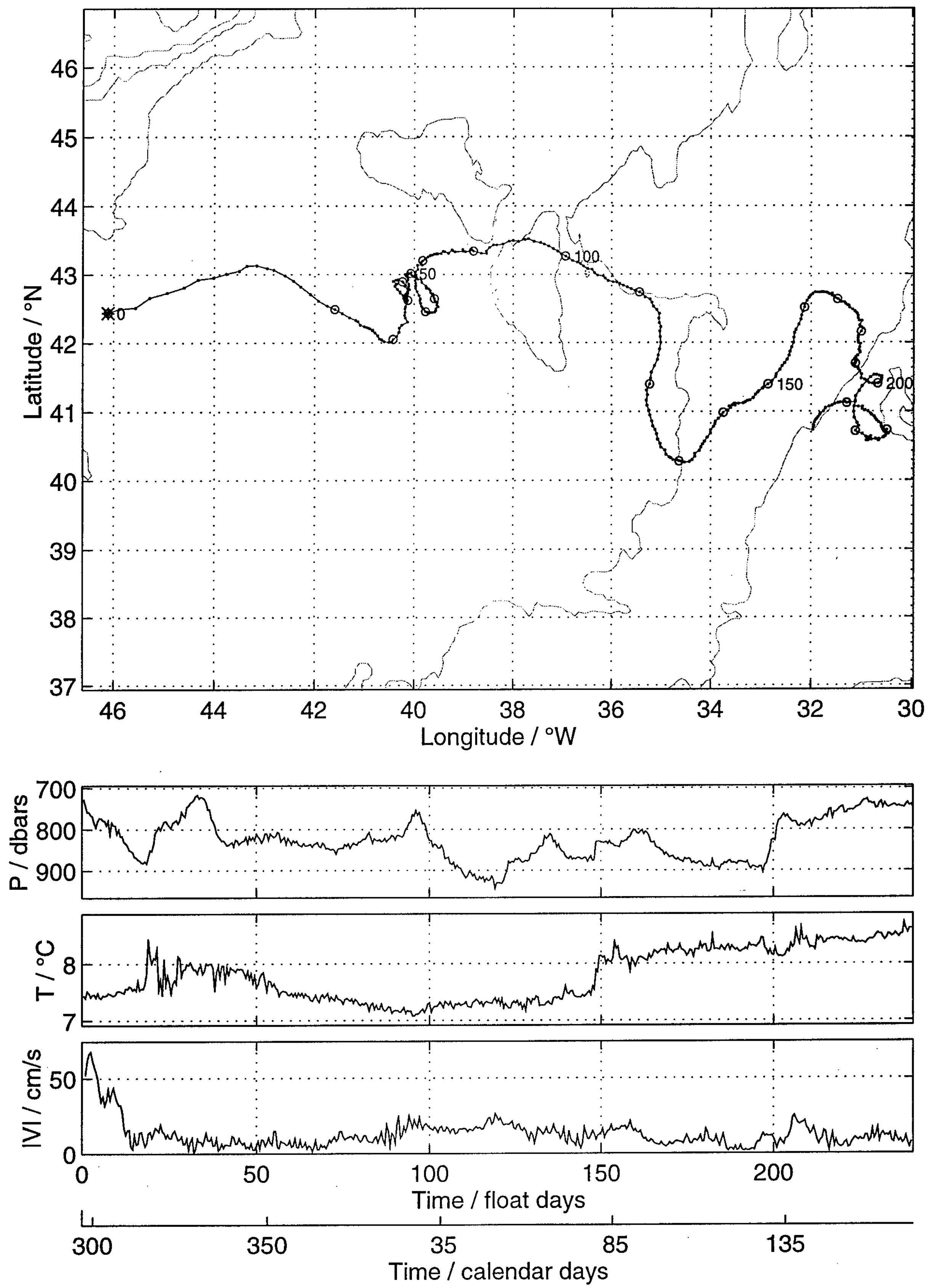

NAC Float 330 – Vocha Data
P / dbars
600
800
1000
1200
delta P / dbars
200
100
0
−100
−200
T / °C
12
10
8
6
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
300
350
35
85
135
Time / calendar days

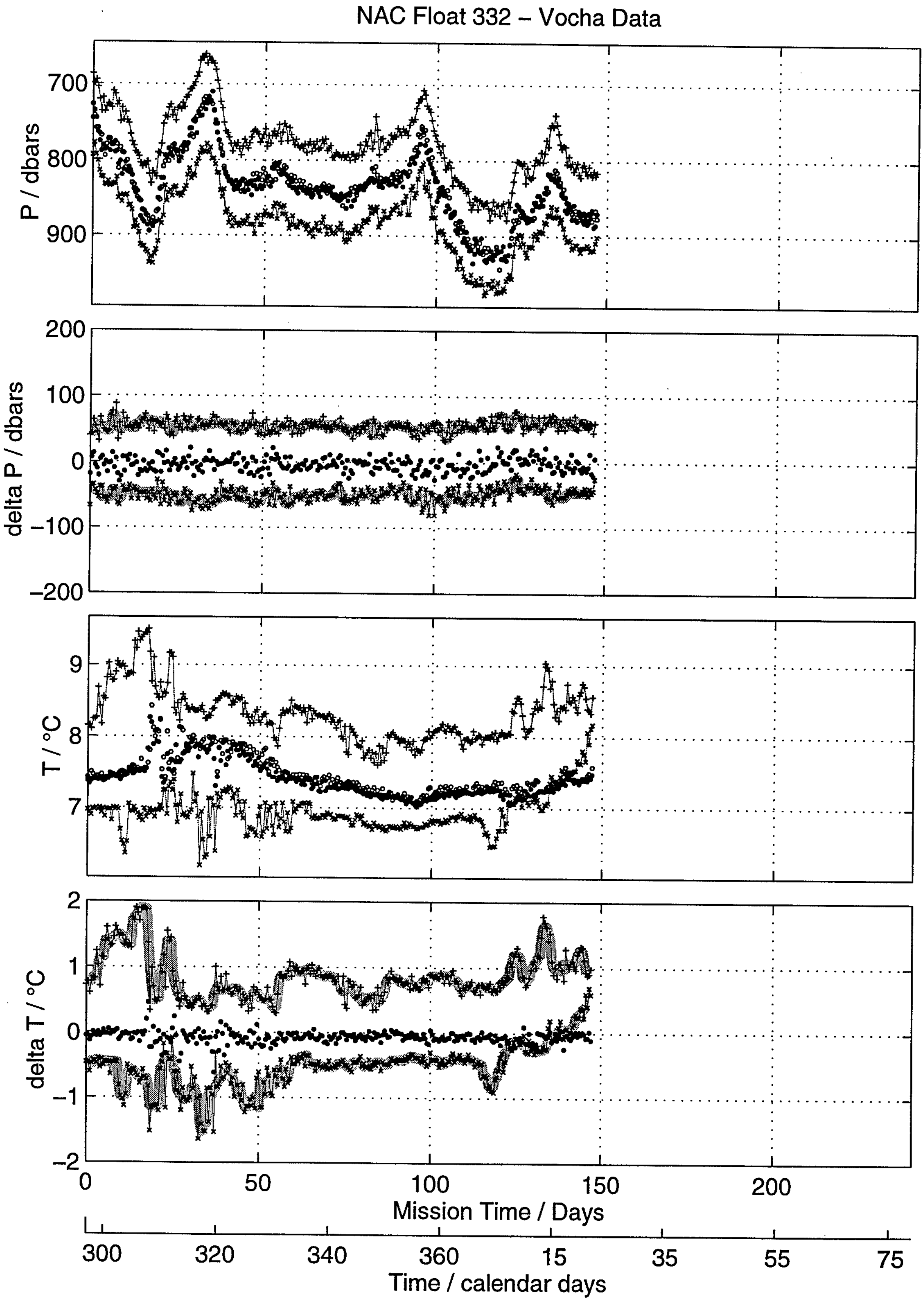

NAC Float 331 – YearDay Start 305.5
Latitude / °N
Longitude / °W
150
100
200
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

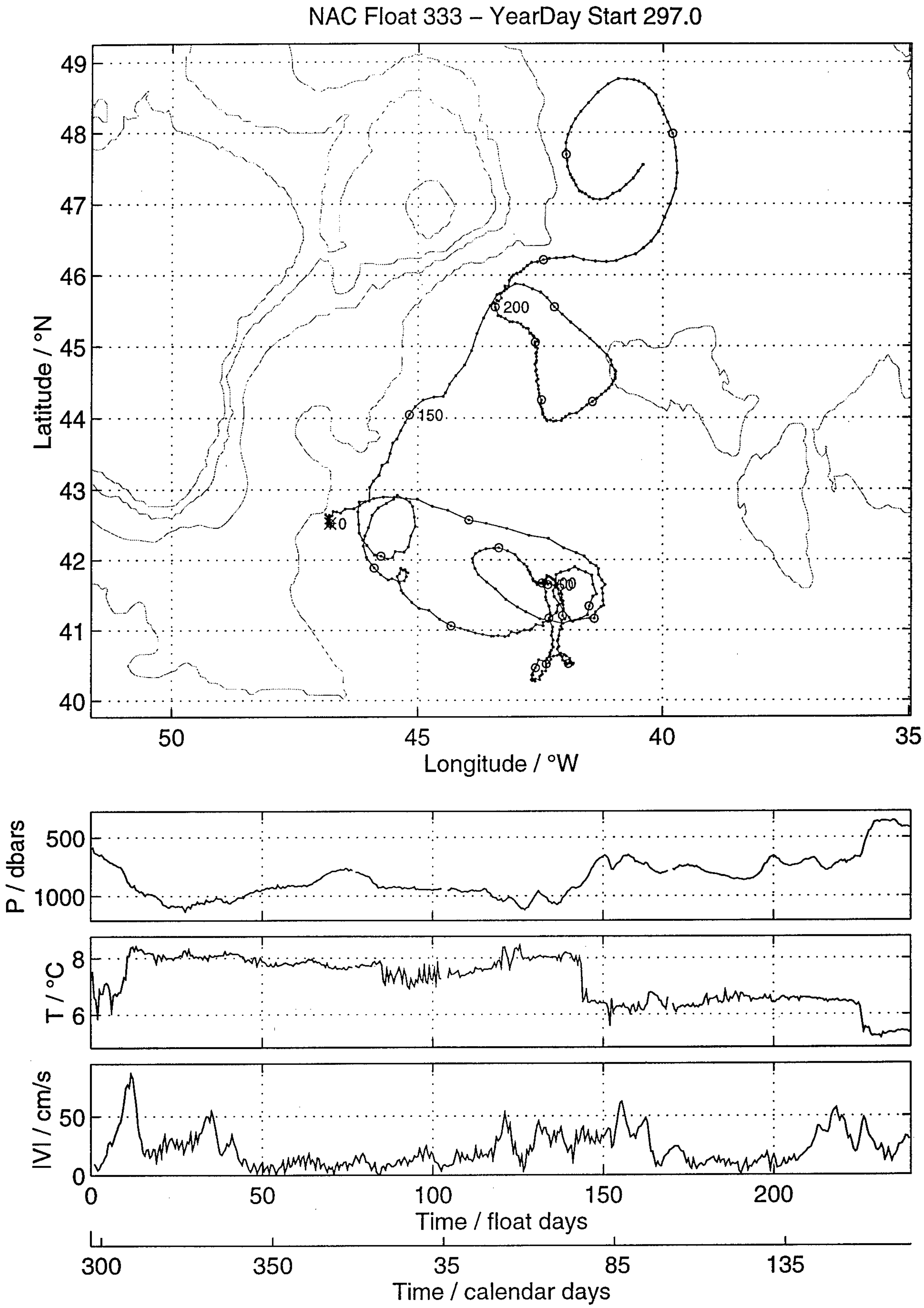


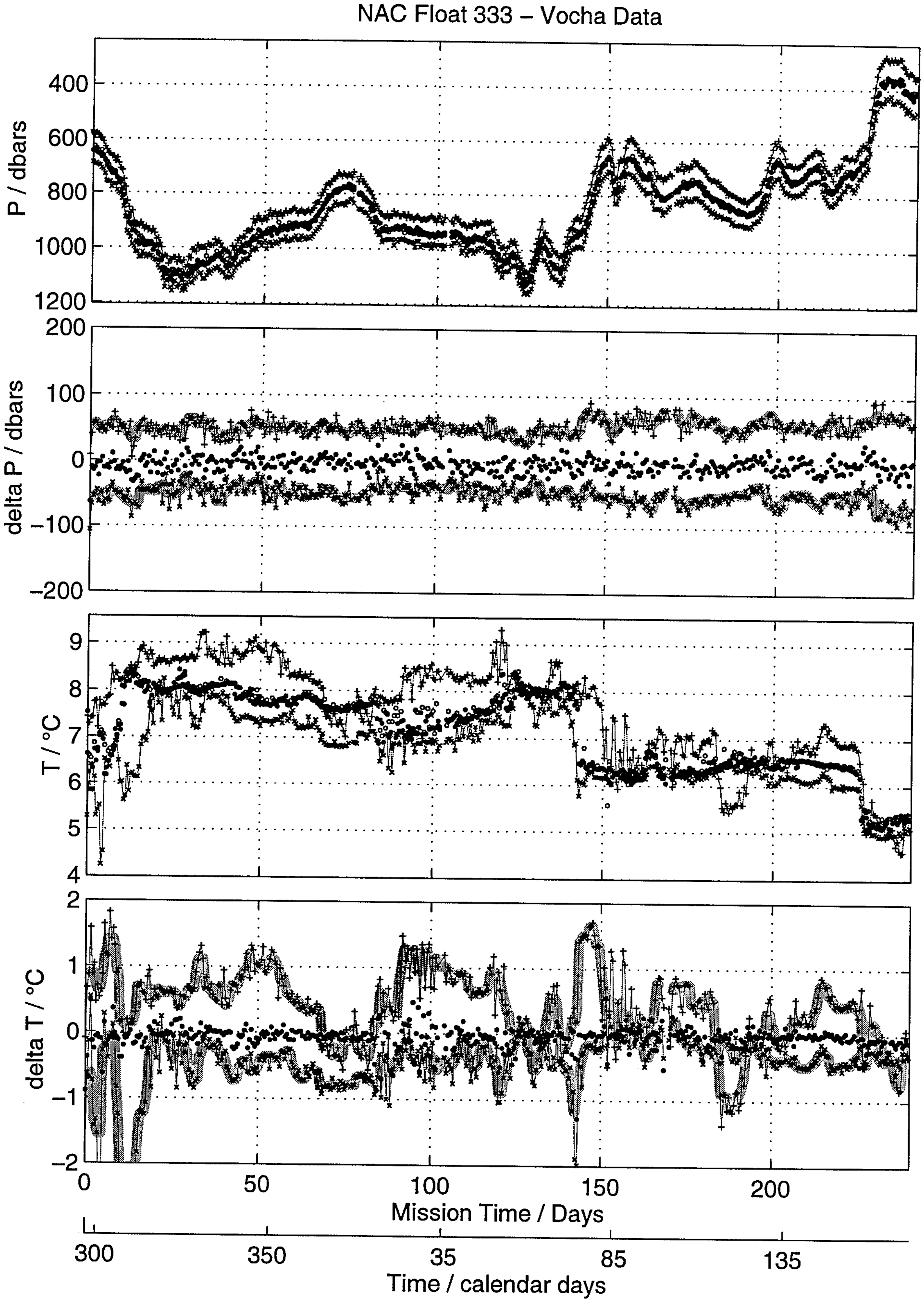
NAC Float 331 – Vocha Data
P / dbars
200
400
600
800
delta P / dbars
200
100
0
−100
−200
T / °C
7
6
5
4
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

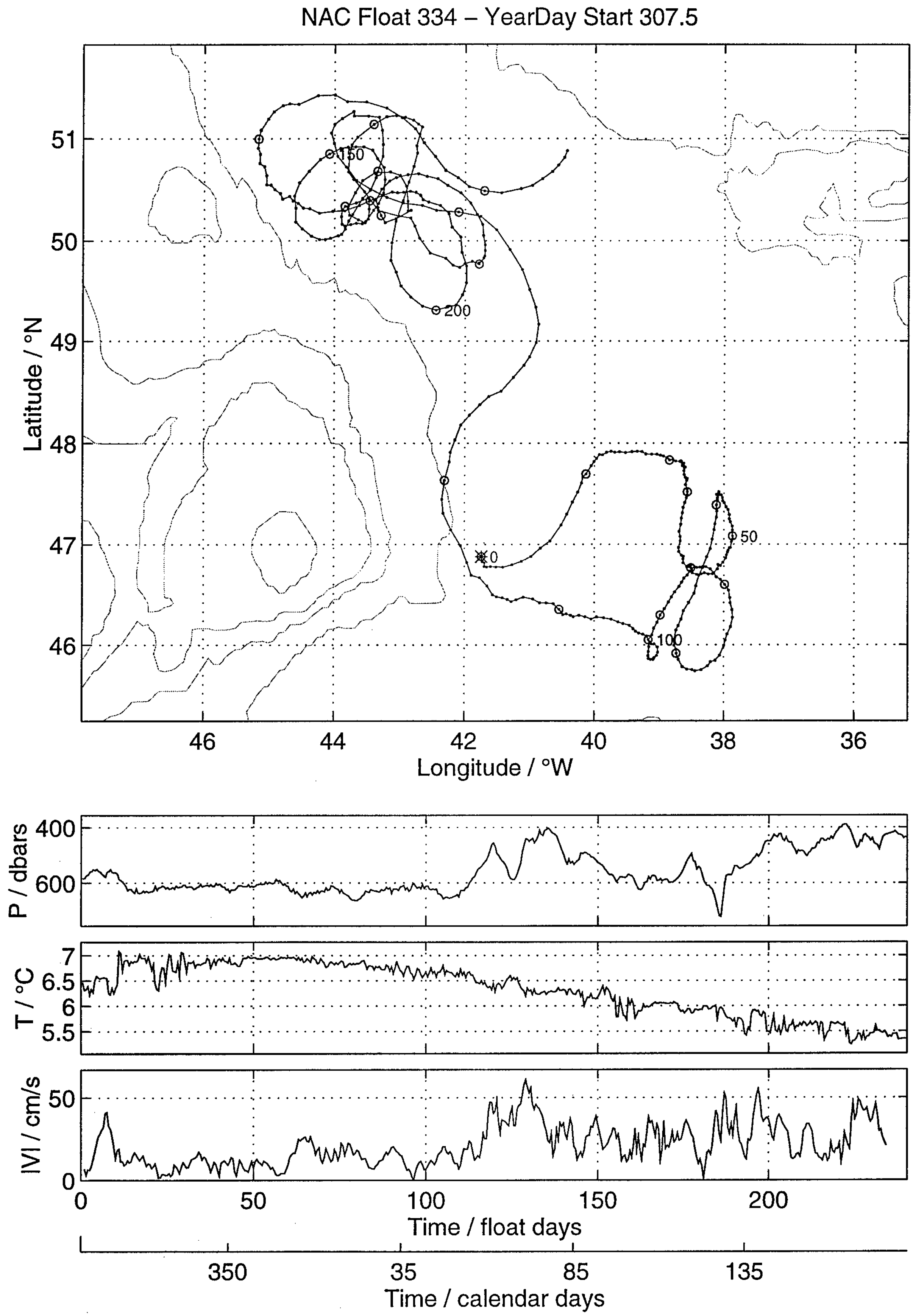
NAC Float 332 – YearDay Start 297.0



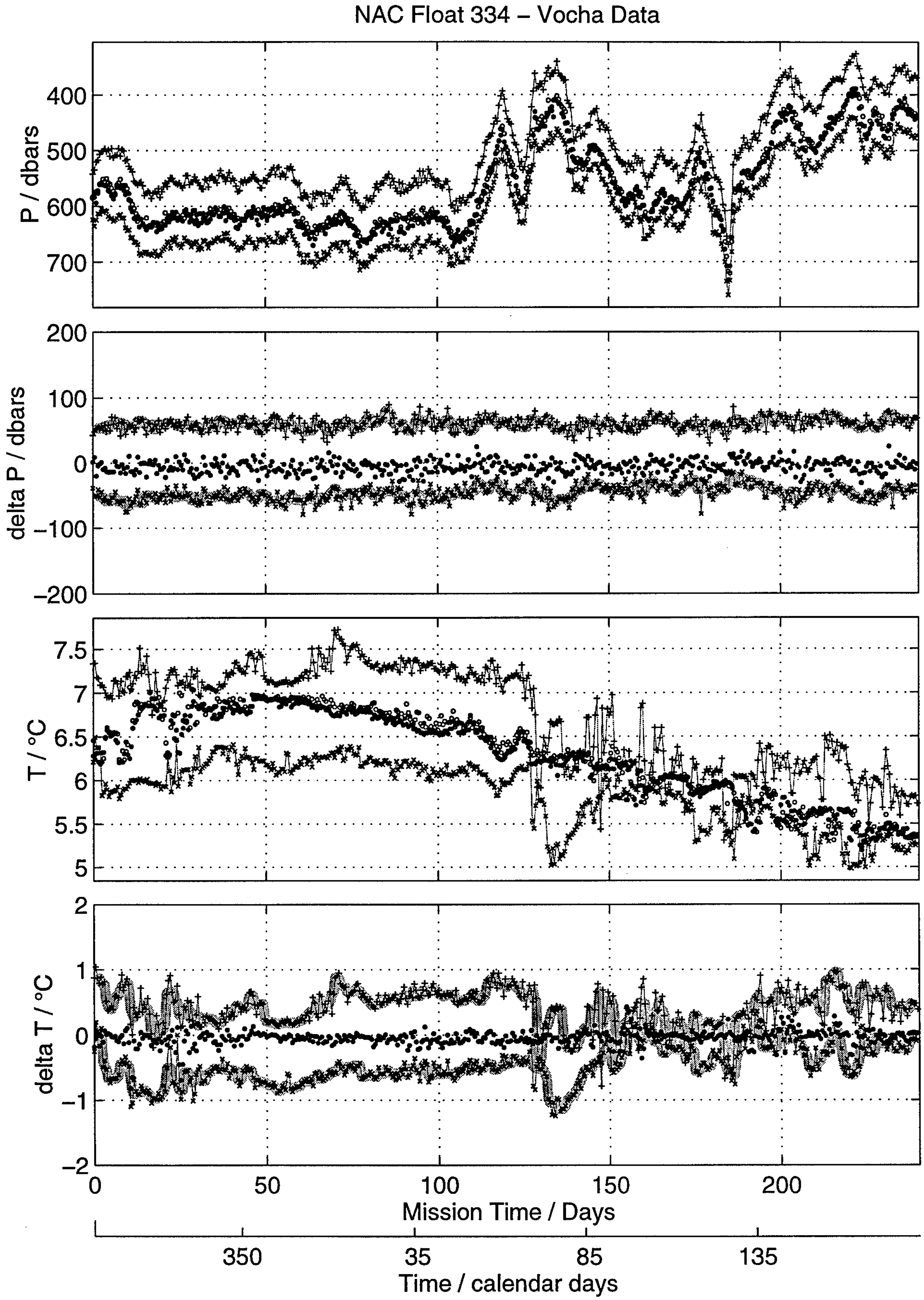

NAC Float 332 – Vocha Data
P / dbars
700
800
900
delta P / dbars
200
100
0
−100
−200
T / °C
9
8
7
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
300
320
340
360
15
35
55
75
Time / calendar days

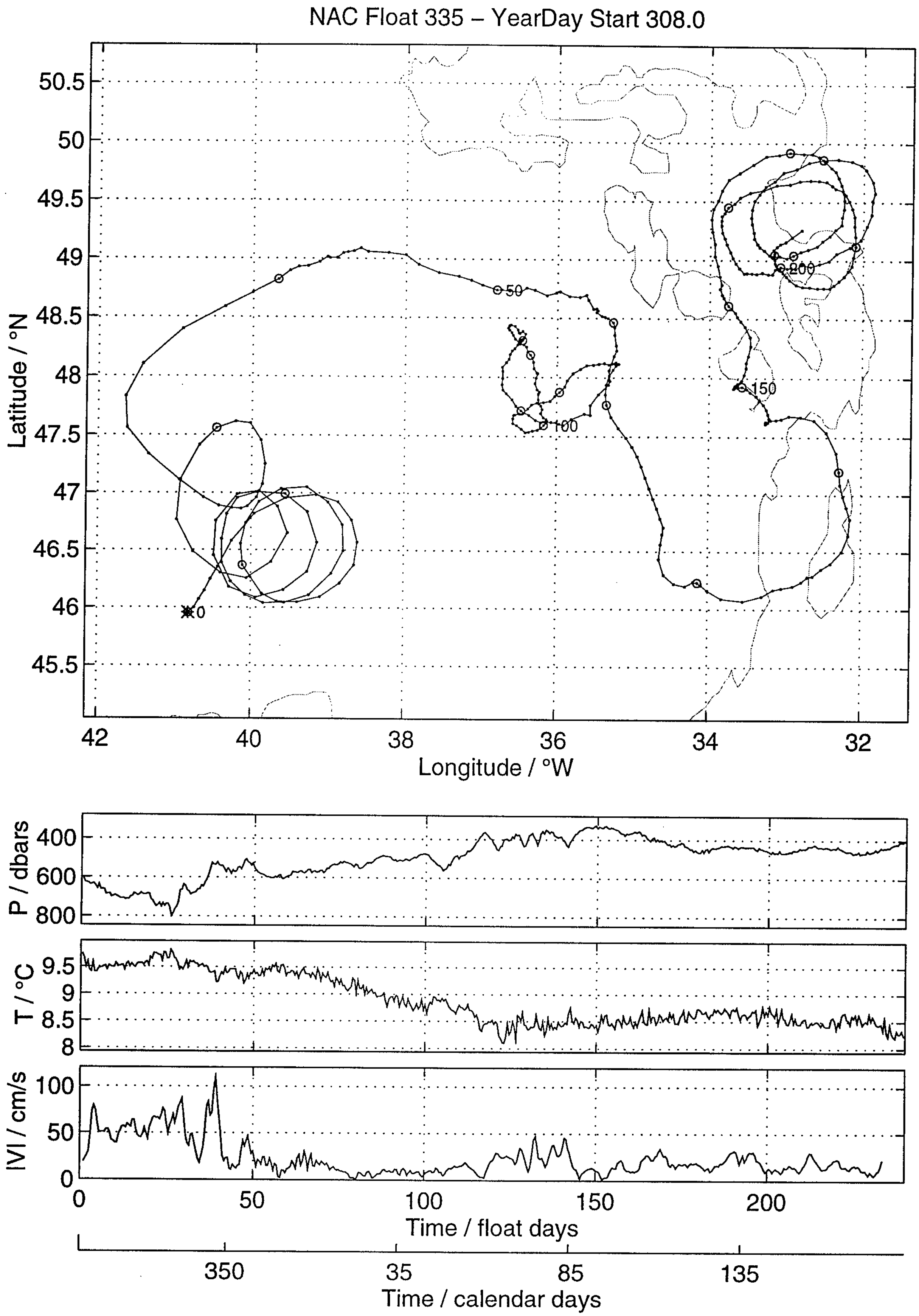

NAC Float 333 – YearDay Start 297.0
Latitude / °N
Longitude / °W
49
48
47
46
45
44
43
42
41
40
50
45
40
35
200
150
0
P / dbars
500
1000
T / °C
8
6
|V| / cm/s
50
0
0
50
100
150
200
Time / float days
300
350
35
85
135
Time / calendar days

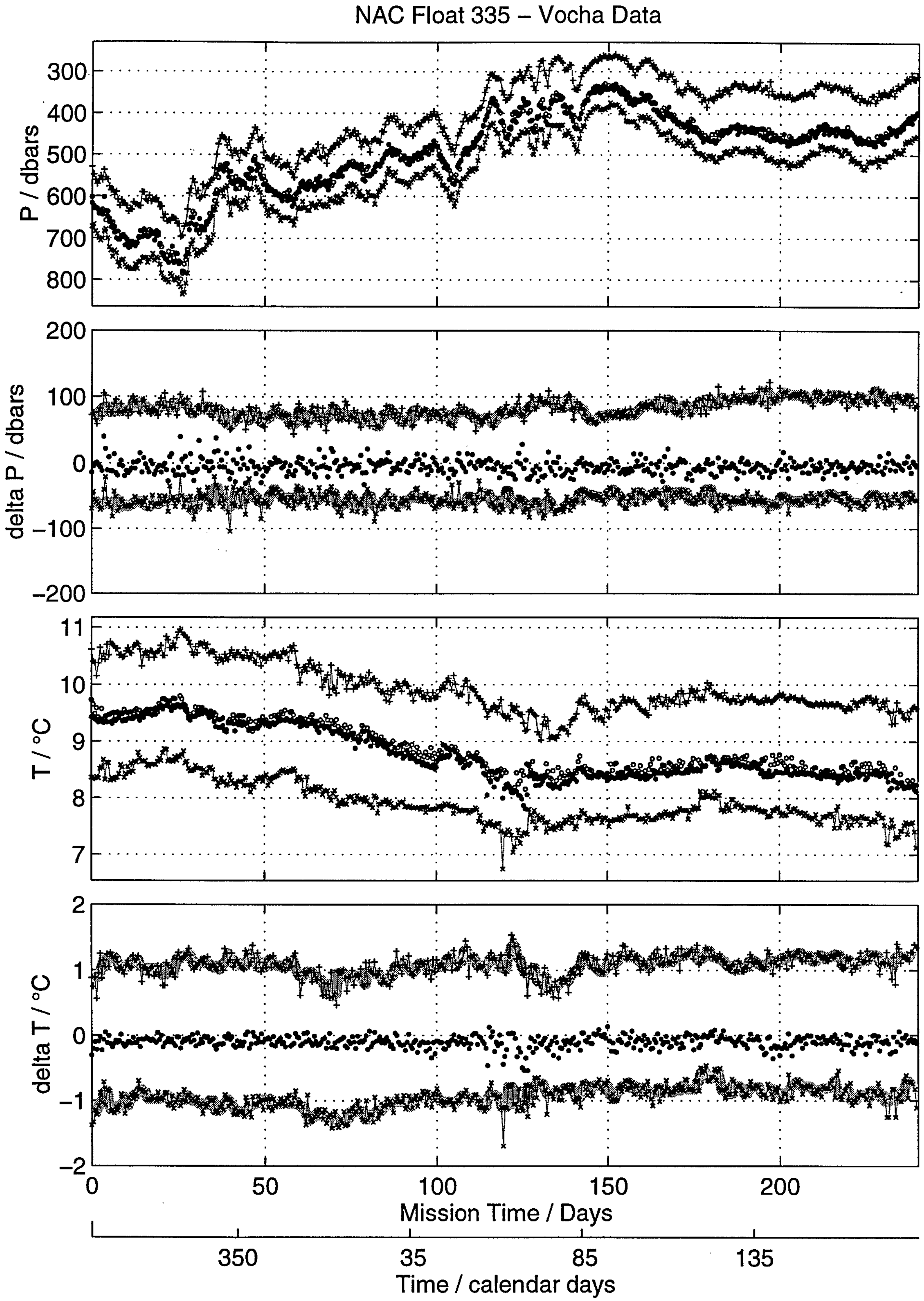

NAC Float 333 – Vocha Data
P / dbars
400
600
800
1000
1200
delta P / dbars
200
100
0
−100
−200
T / °C
9
8
7
6
5
4
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
300
350
35
85
135
Time / calendar days



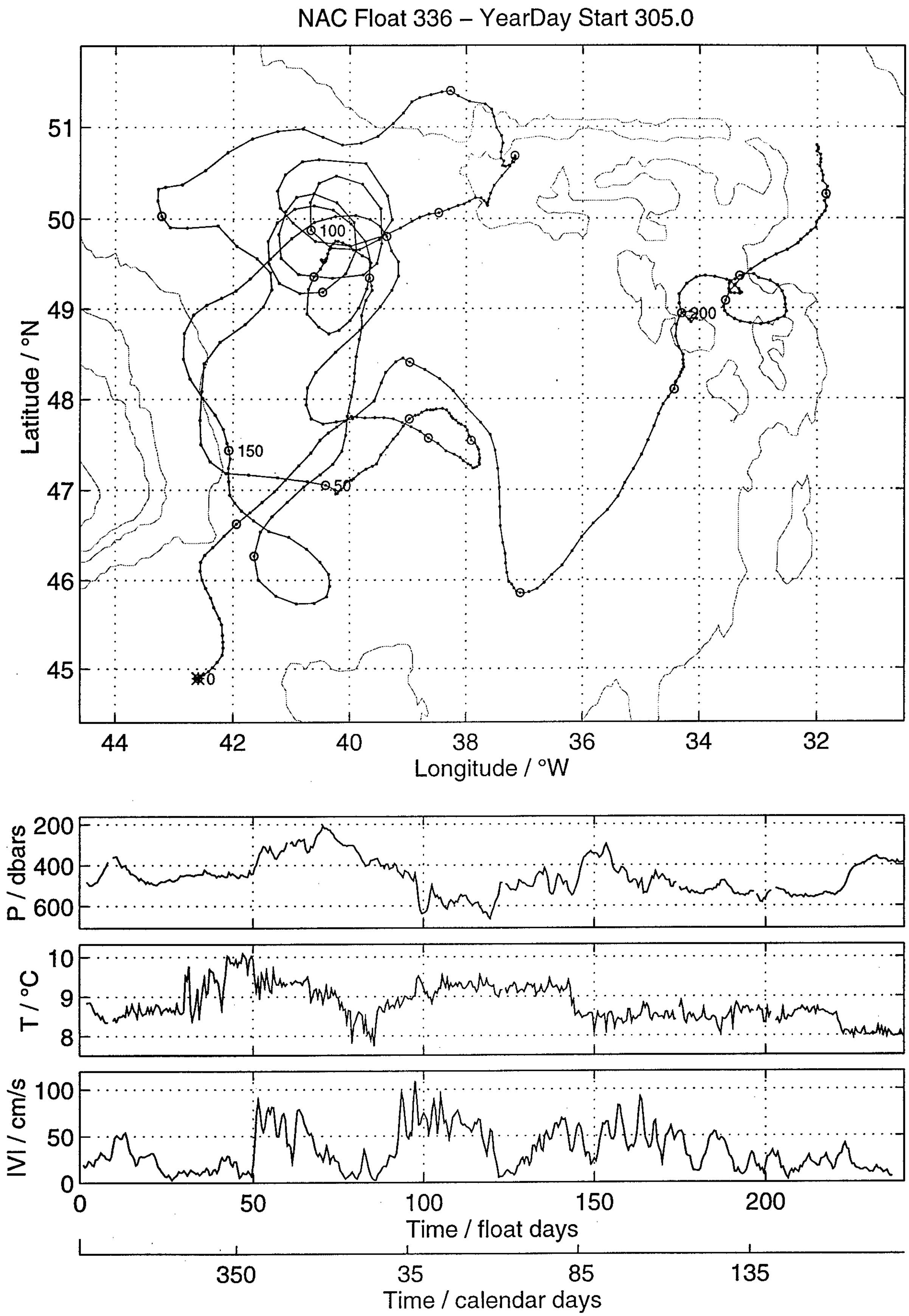
NAC Float 334 – YearDay Start 307.5
Latitude / °N
Longitude / °W
51
50
49
48
47
46
46
44
42
40
38
36
0
50
100
150
200
P / dbars
400
600
T / °C
7
6.5
6
5.5
|V| / cm/s
50
0
0
50
100
150
200
Time / float days
350
35
85
135
Time / calendar days


NAC Float 334 – Vocha Data
P / dbars
400
500
600
700
delta P / dbars
200
100
0
−100
−200
T / °C
7.5
7
6.5
6
5.5
5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

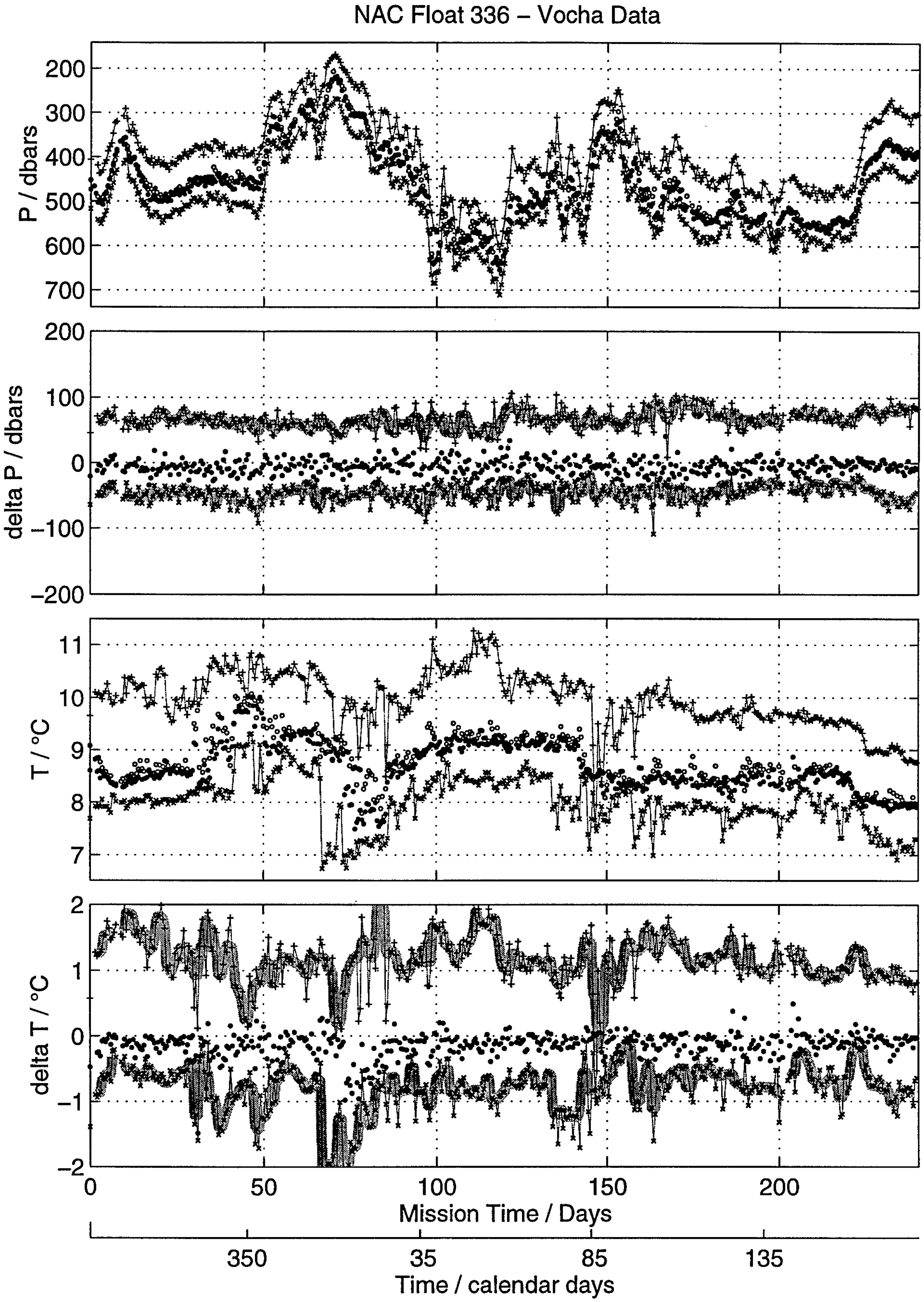

NAC Float 335 – YearDay Start 308.0
Latitude / °N
Longitude / °W
50.5
50
49.5
49
48.5
48
47.5
47
46.5
46
45.5
42
40
38
36
34
32
0
50
100
150
200
P / dbars
400
600
800
T / °C
9.5
9
8.5
8
|V| / cm/s
100
50
0
Time / float days
350
35
85
135
Time / calendar days



NAC Float 335 – Vocha Data
P / dbars
300
400
500
600
700
800
delta P / dbars
200
100
0
−100
−200
T / °C
11
10
9
8
7
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

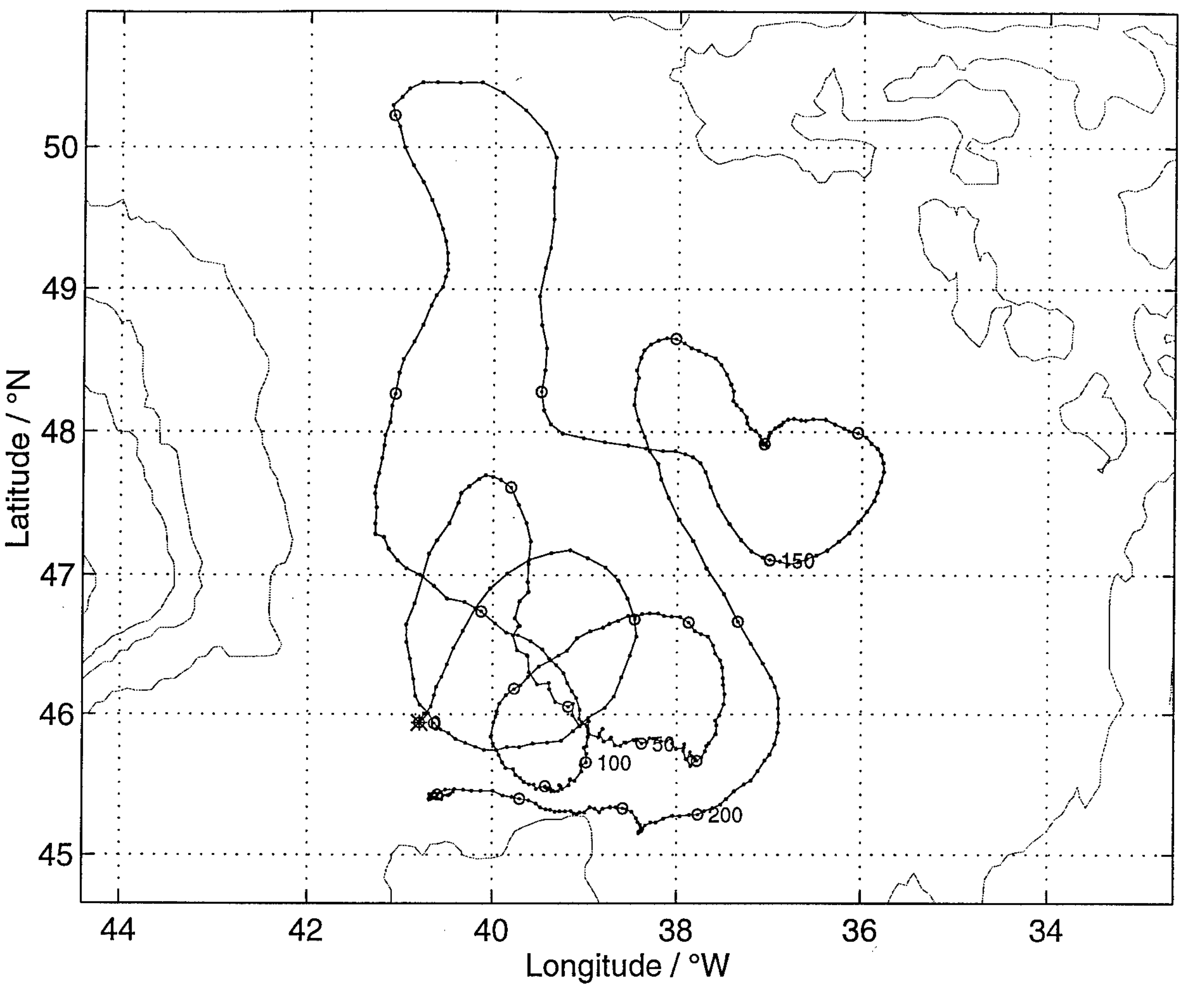


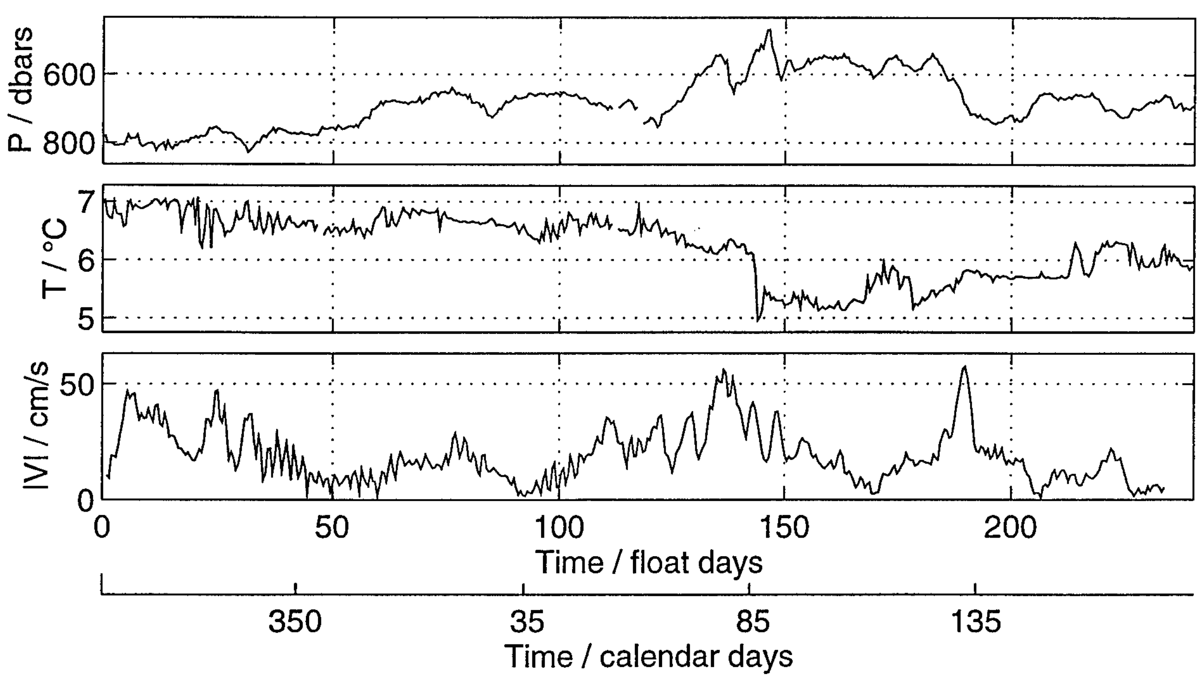
NAC Float 336 – YearDay Start 305.0
Latitude / °N
Longitude / °W
100
150
50
200
0
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

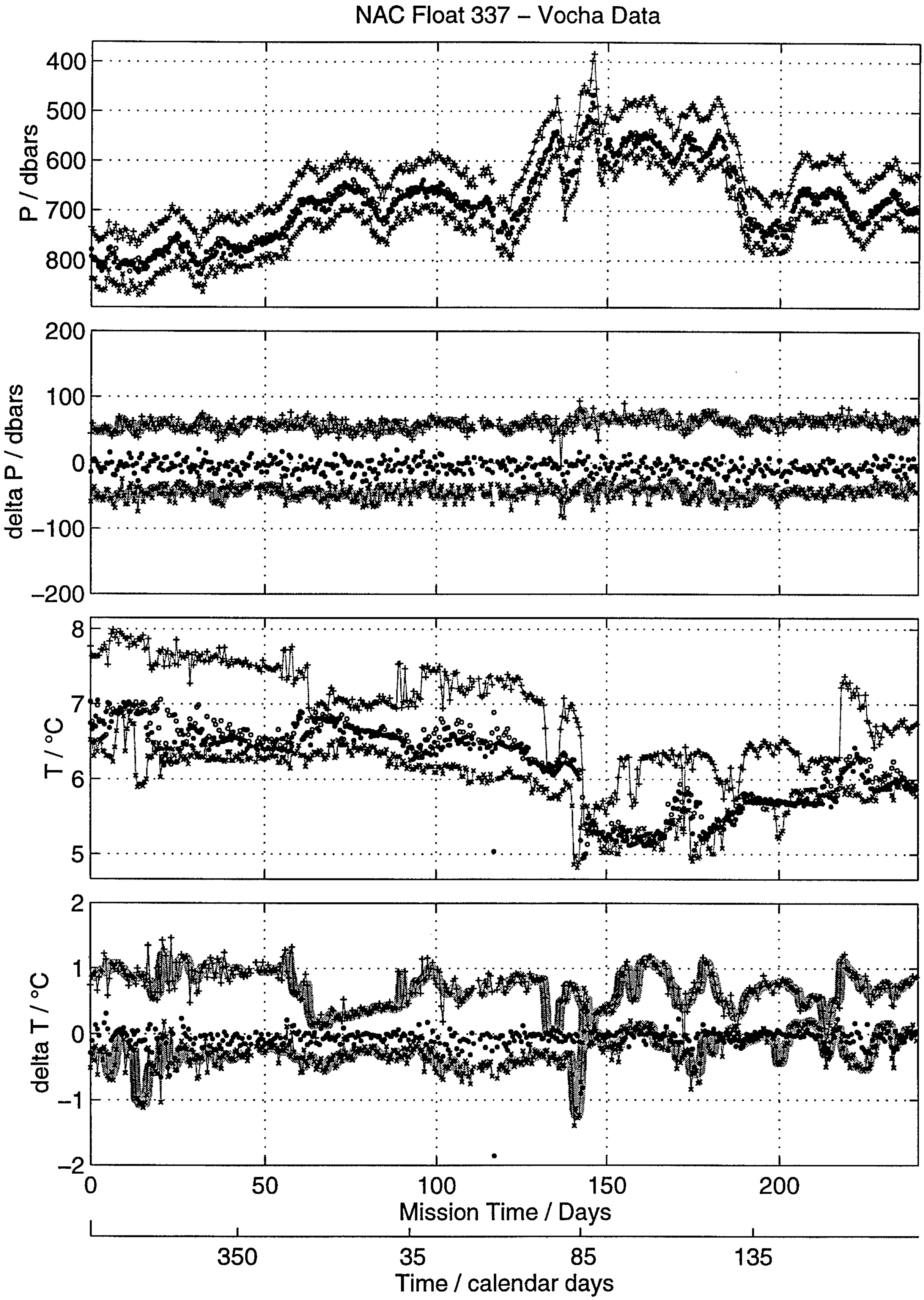


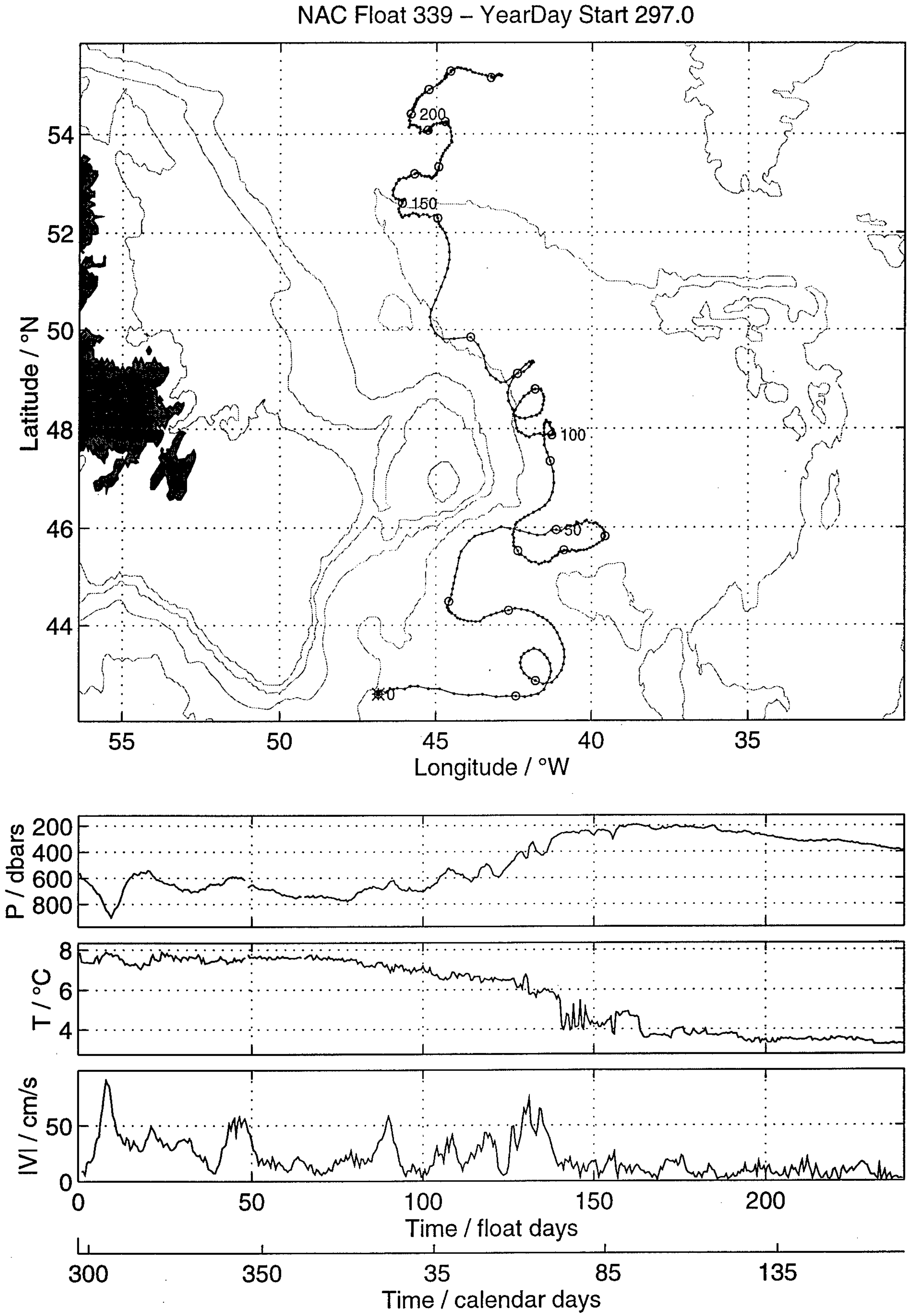
NAC Float 336 – Vocha Data
P / dbars
200
300
400
500
600
700
delta P / dbars
200
100
0
−100
−200
T / °C
11
10
9
8
7
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

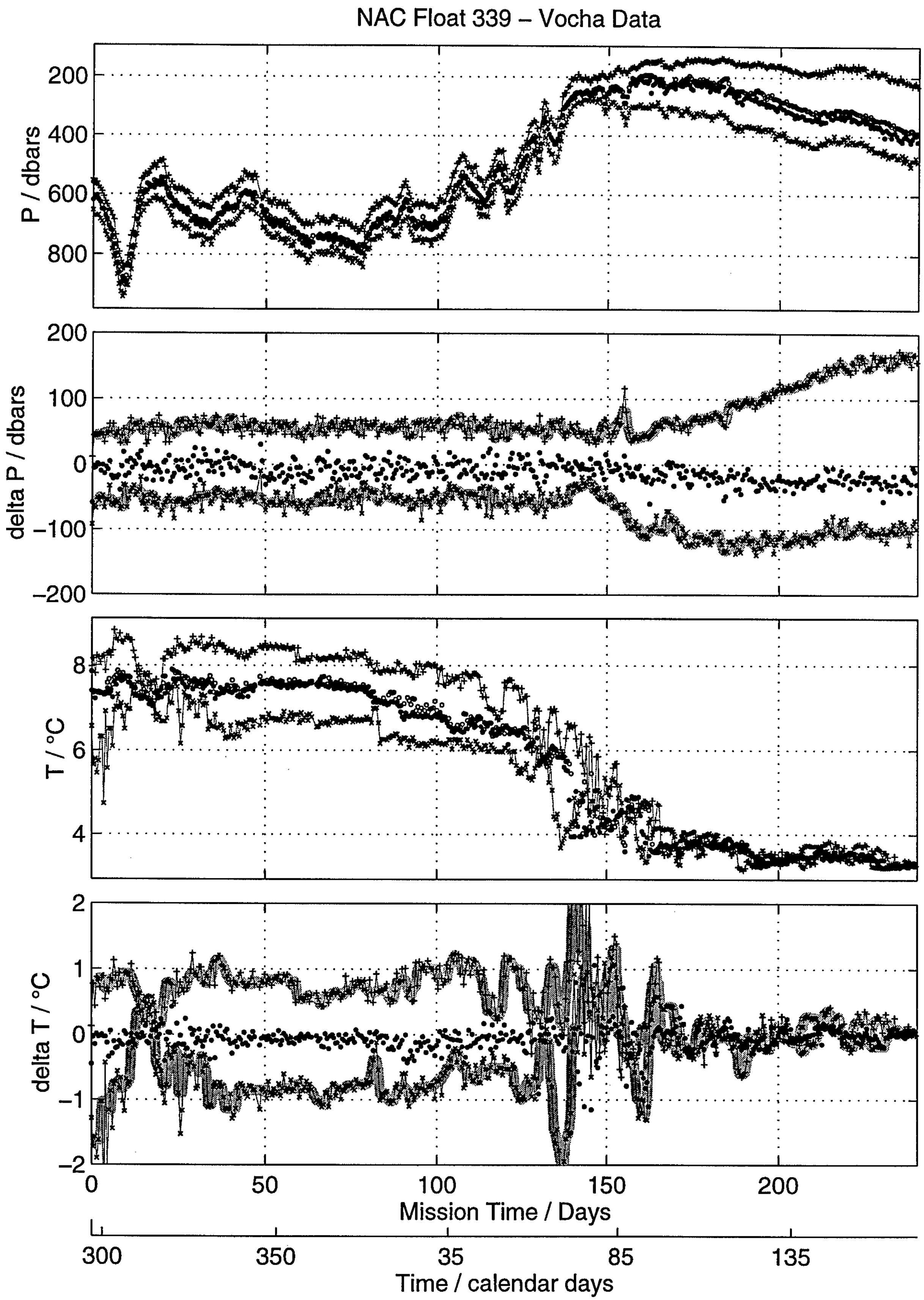
NAC Float 337 – YearDay Start 308.0

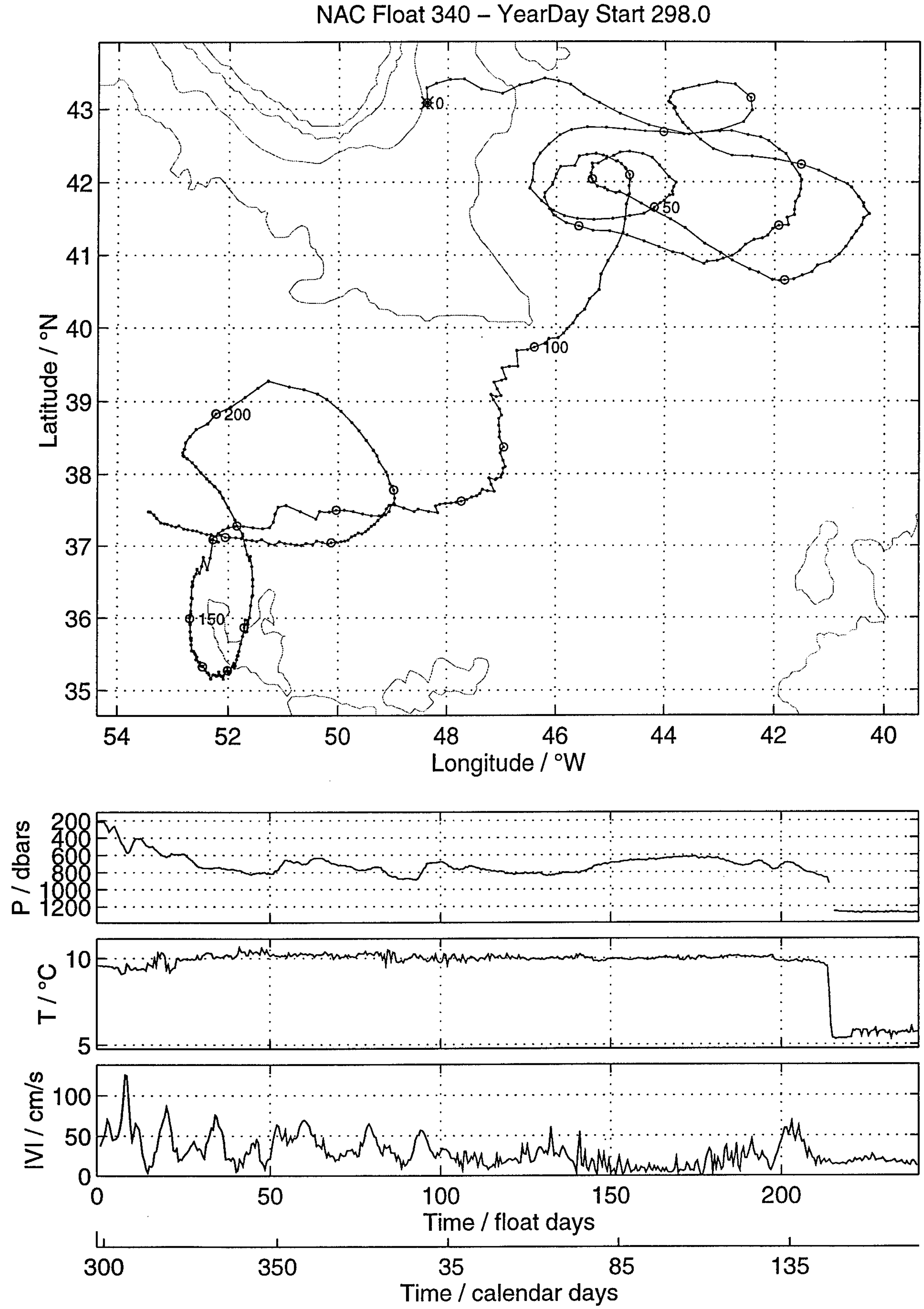




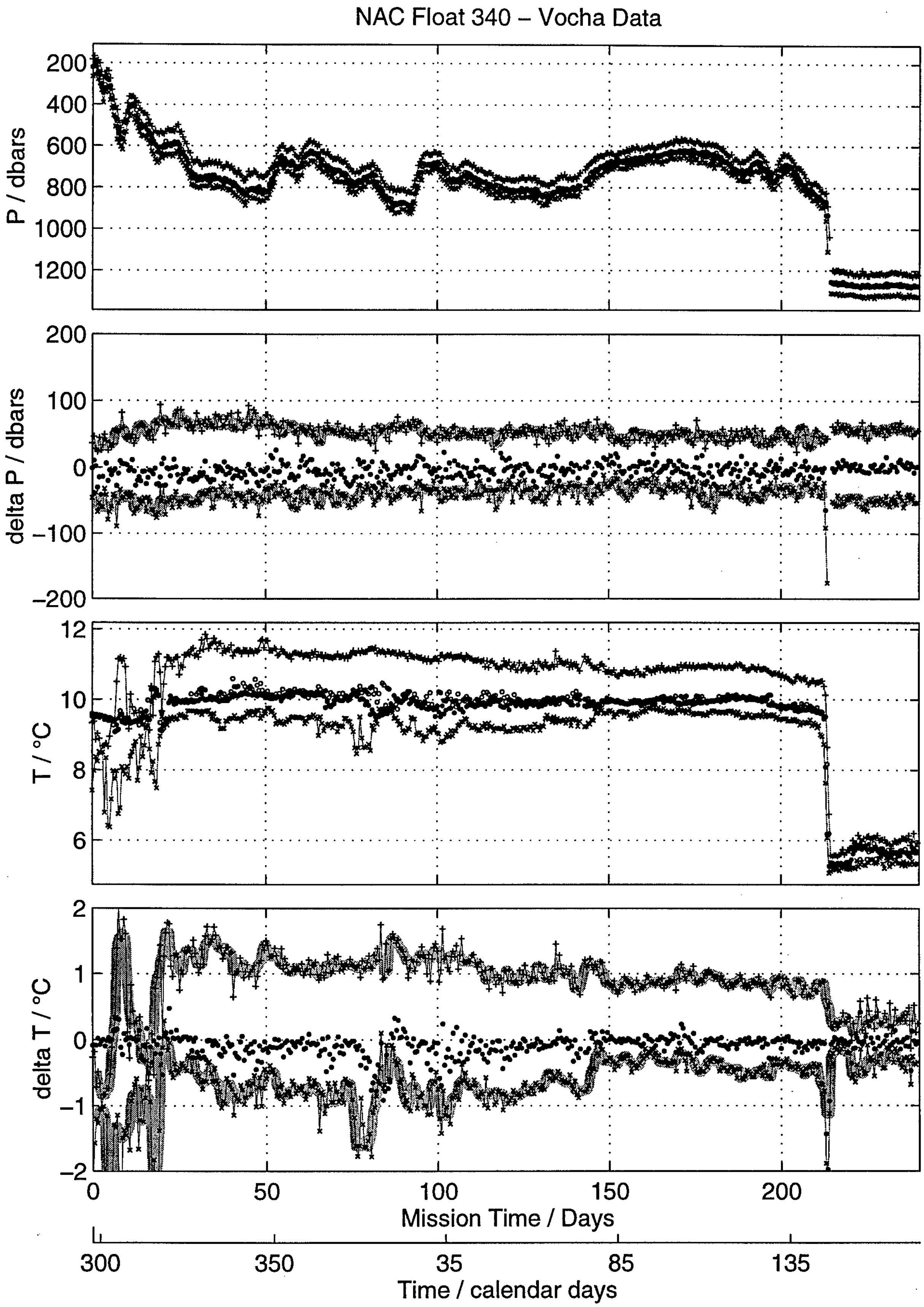

NAC Float 337 – Vocha Data
P / dbars
400
500
600
700
800
delta P / dbars
200
100
0
−100
−200
T / °C
8
7
6
5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

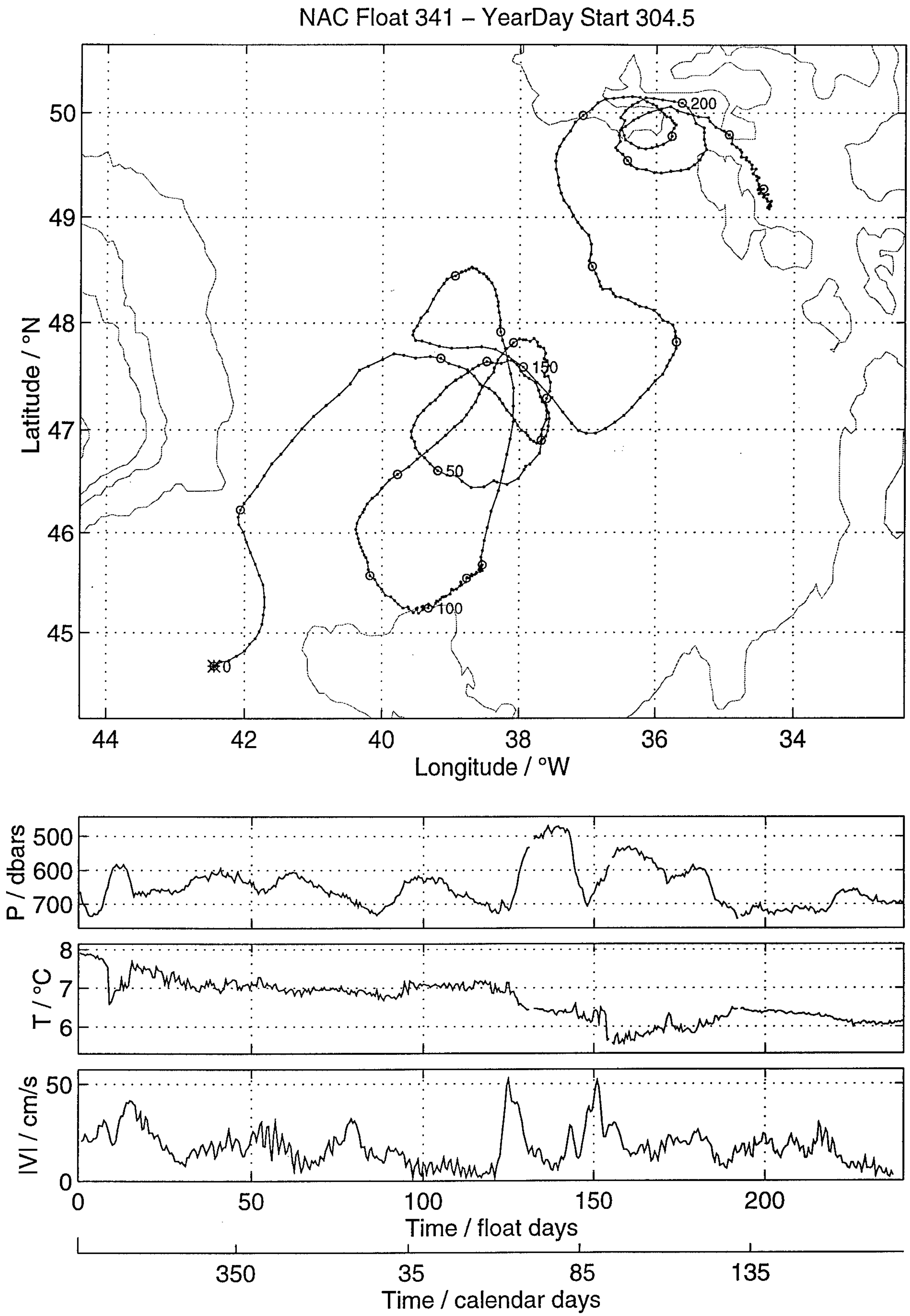

NAC Float 339 – YearDay Start 297.0
Latitude / °N
54
52
50
48
46
44
55
50
45
40
35
Longitude / °W
200
150
100
50
0
P / dbars
200
400
600
800
T / °C
8
6
4
|V| / cm/s
50
0
0
50
100
150
200
Time / float days
300
350
35
85
135
Time / calendar days


NAC Float 339 – Vocha Data
P / dbars
200
400
600
800
delta P / dbars
200
100
0
−100
−200
T / °C
8
6
4
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
300
350
35
85
135
Time / calendar days

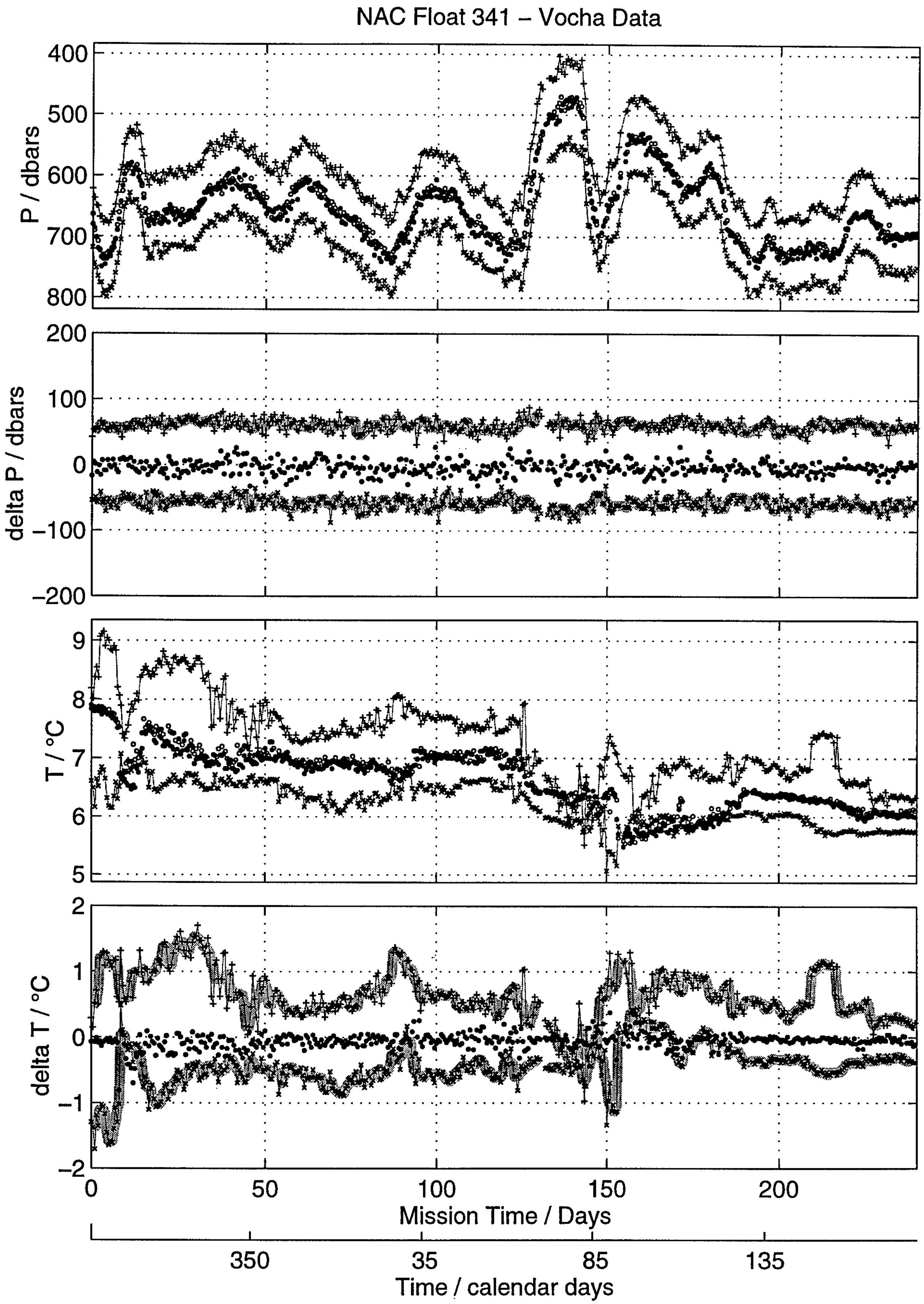


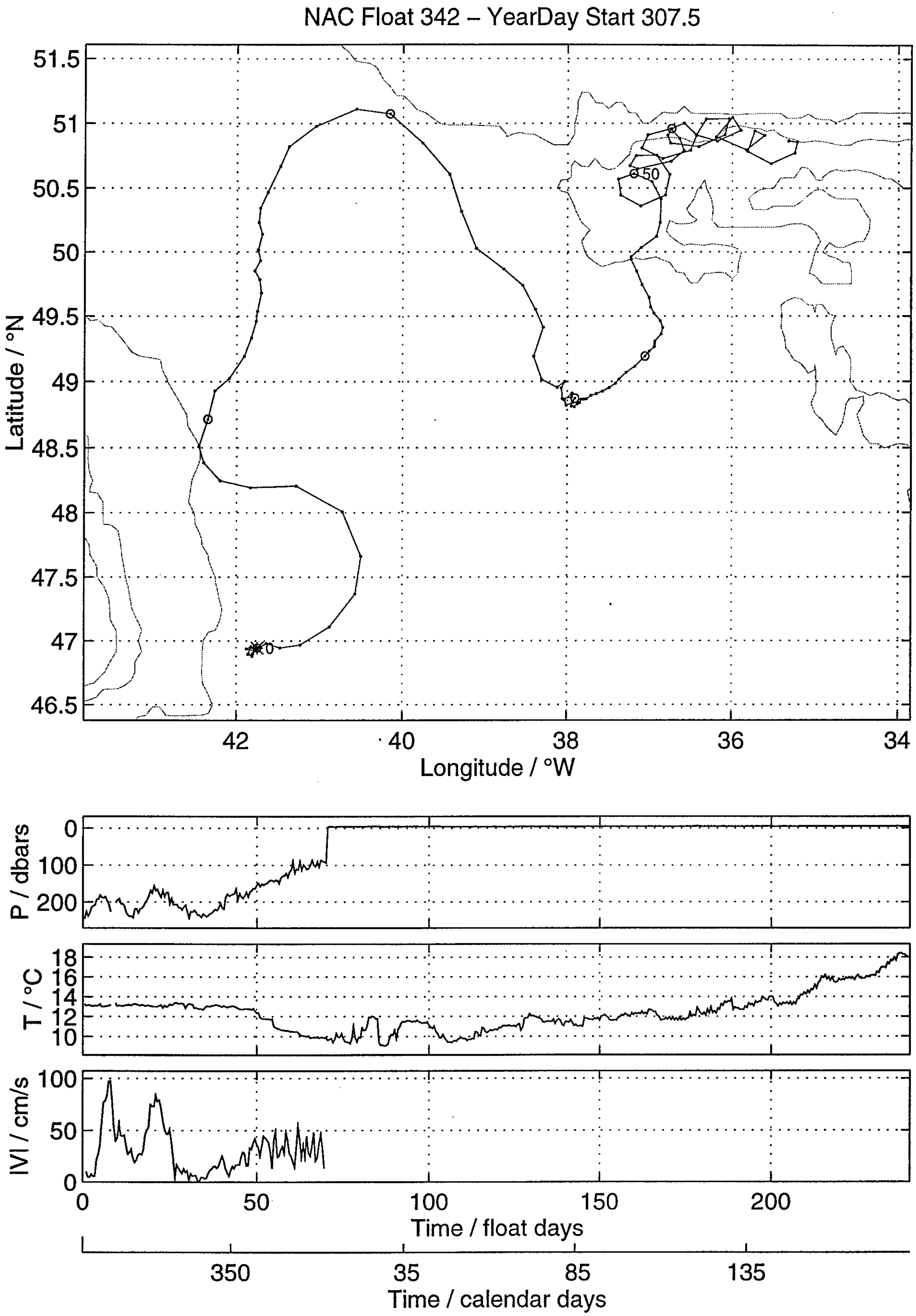
NAC Float 340 – YearDay Start 298.0
Latitude / °N
Longitude / °W
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days

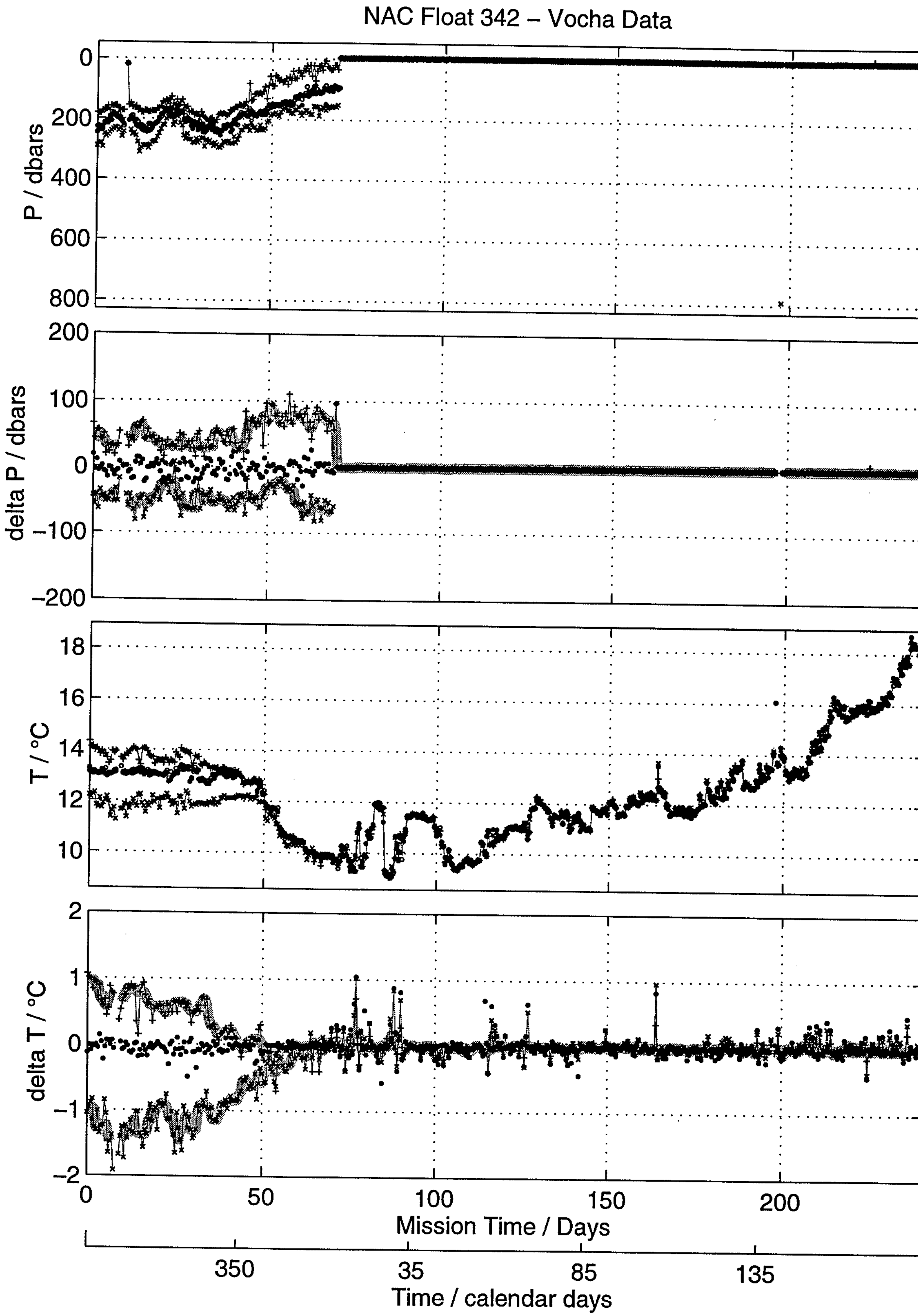

NAC Float 340 – Vocha Data
P / dbars
200
400
600
800
1000
1200
delta P / dbars
200
100
0
−100
−200
T / °C
12
10
8
6
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
300
350
35
85
135
Time / calendar days

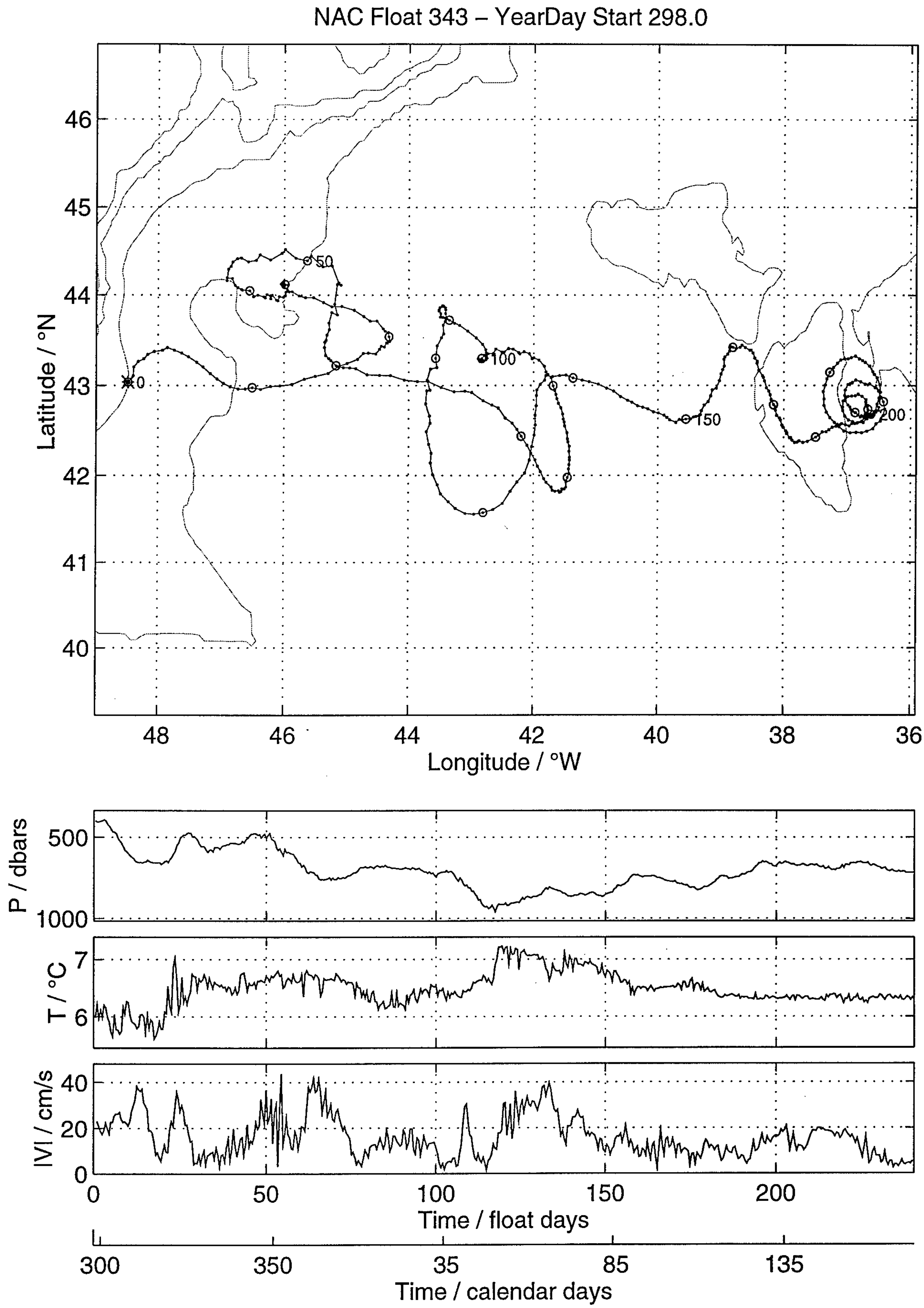


NAC Float 341 – YearDay Start 304.5
Latitude / °N
Longitude / °W
0
50
100
150
200
P / dbars
T / °C
|V| / cm/s
Time / float days
350
35
85
135
Time / calendar days

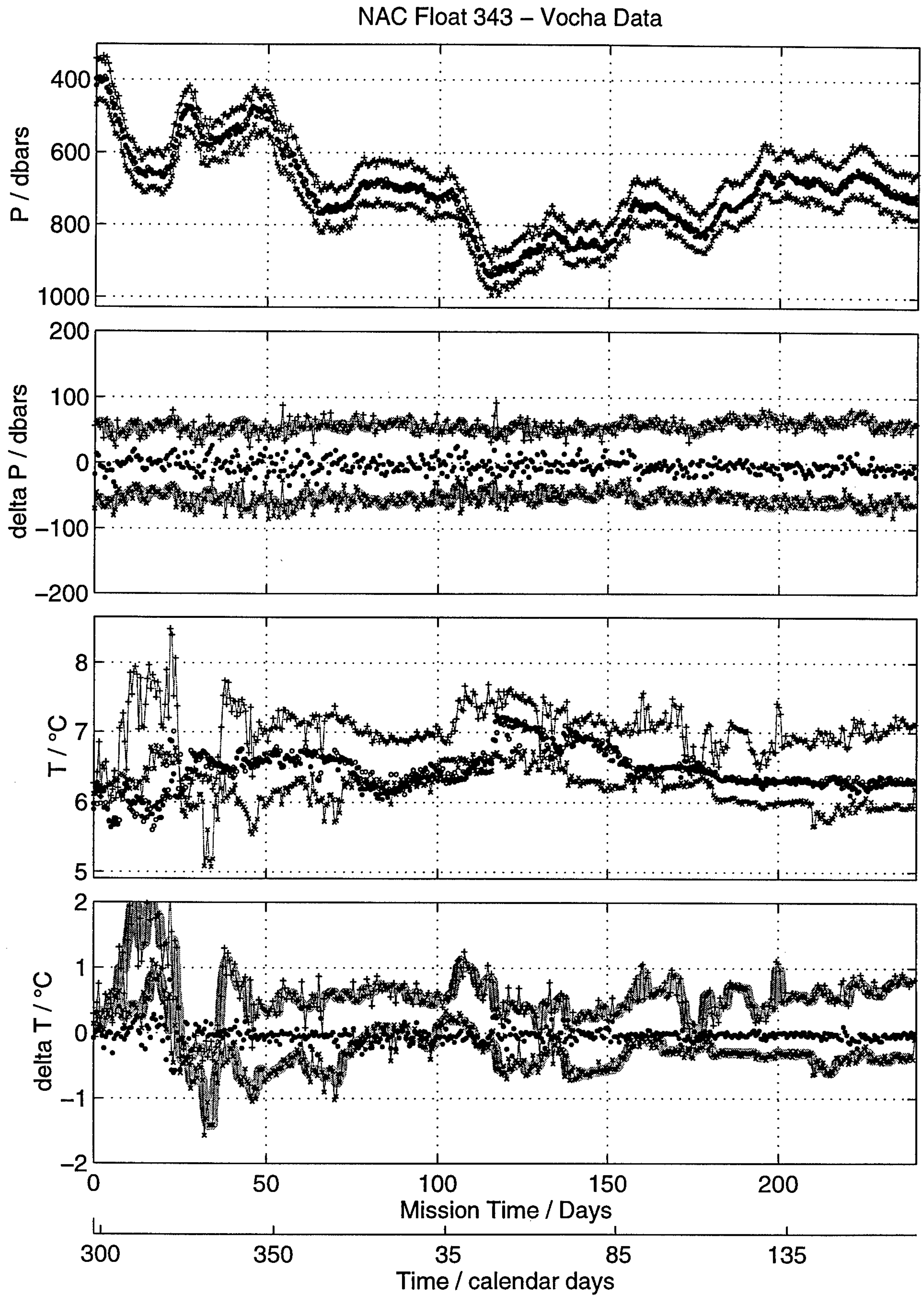

NAC Float 341 – Vocha Data
P / dbars
delta P / dbars
T / °C
delta T / °C
Mission Time / Days
Time / calendar days

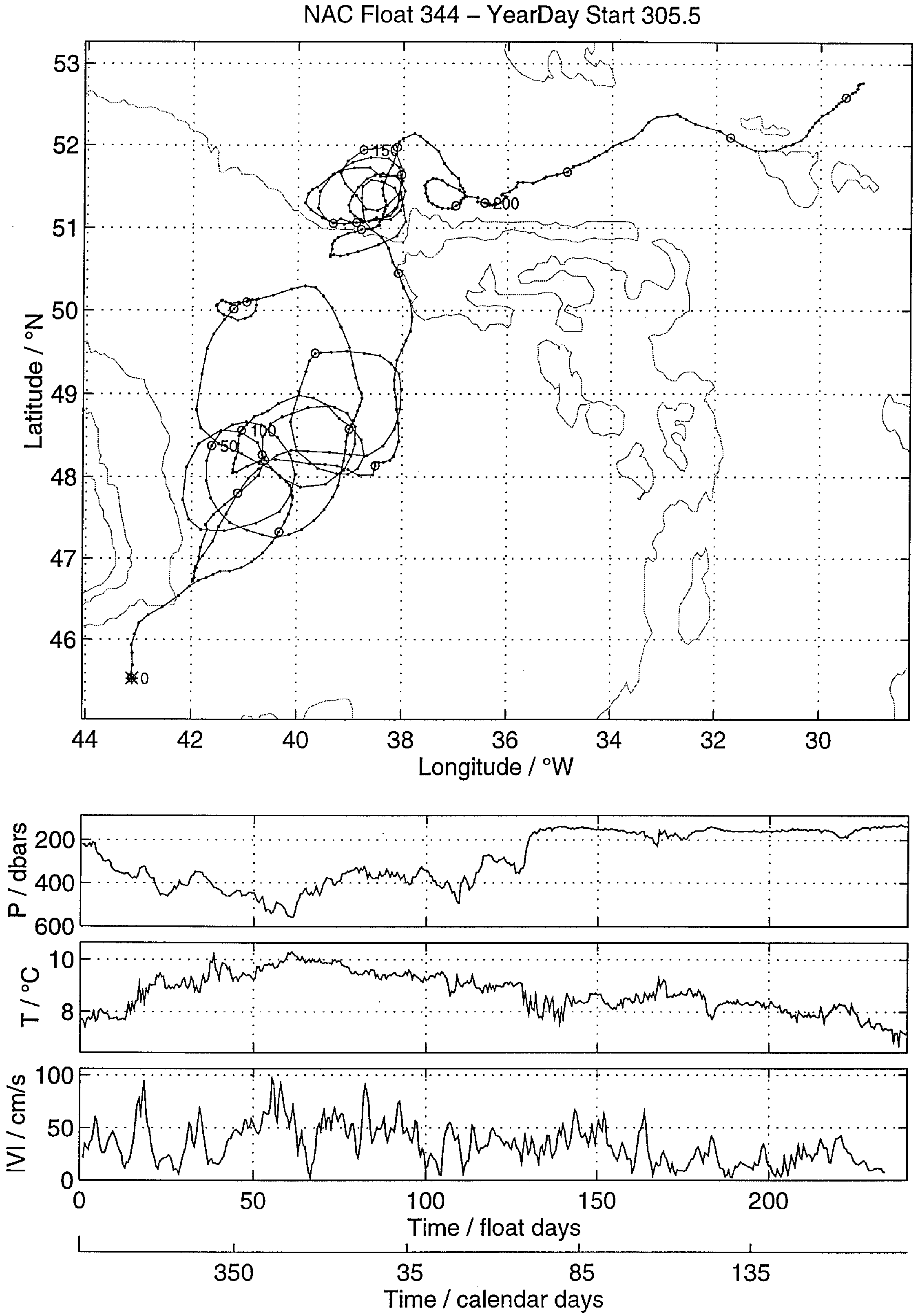

NAC Float 342 – YearDay Start 307.5
Latitude / °N
51.5
51
50.5
50
49.5
49
48.5
48
47.5
47
46.5
42
40
38
36
34
Longitude / °W
0
50
P / dbars
0
100
200
T / °C
18
16
14
12
10
|V| / cm/s
100
50
0
0
50
100
150
200
Time / float days
350
35
85
135
Time / calendar days

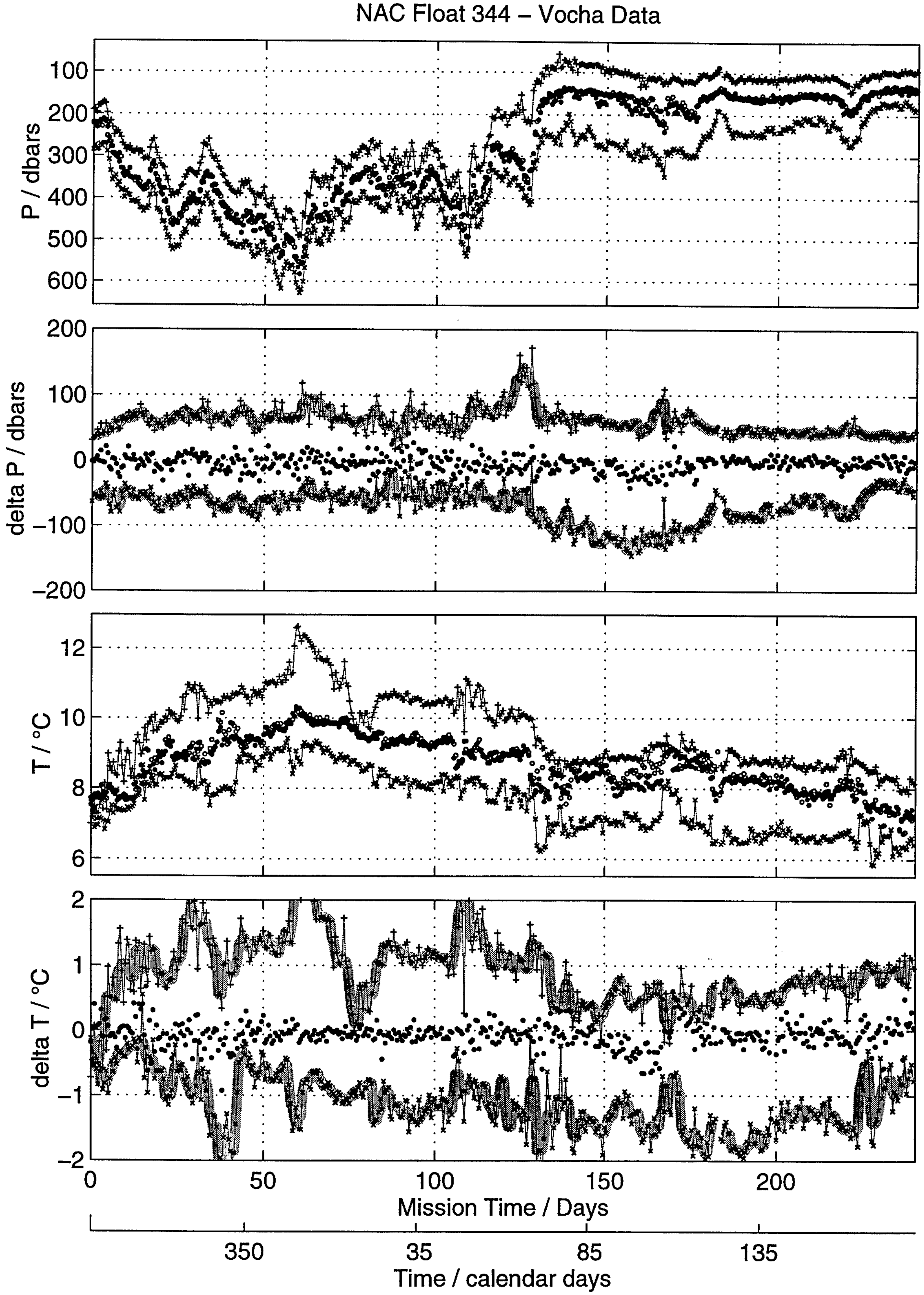

NAC Float 342 – Vocha Data
P / dbars
0
200
400
600
800
delta P / dbars
200
100
0
−100
−200
T / °C
18
16
14
12
10
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

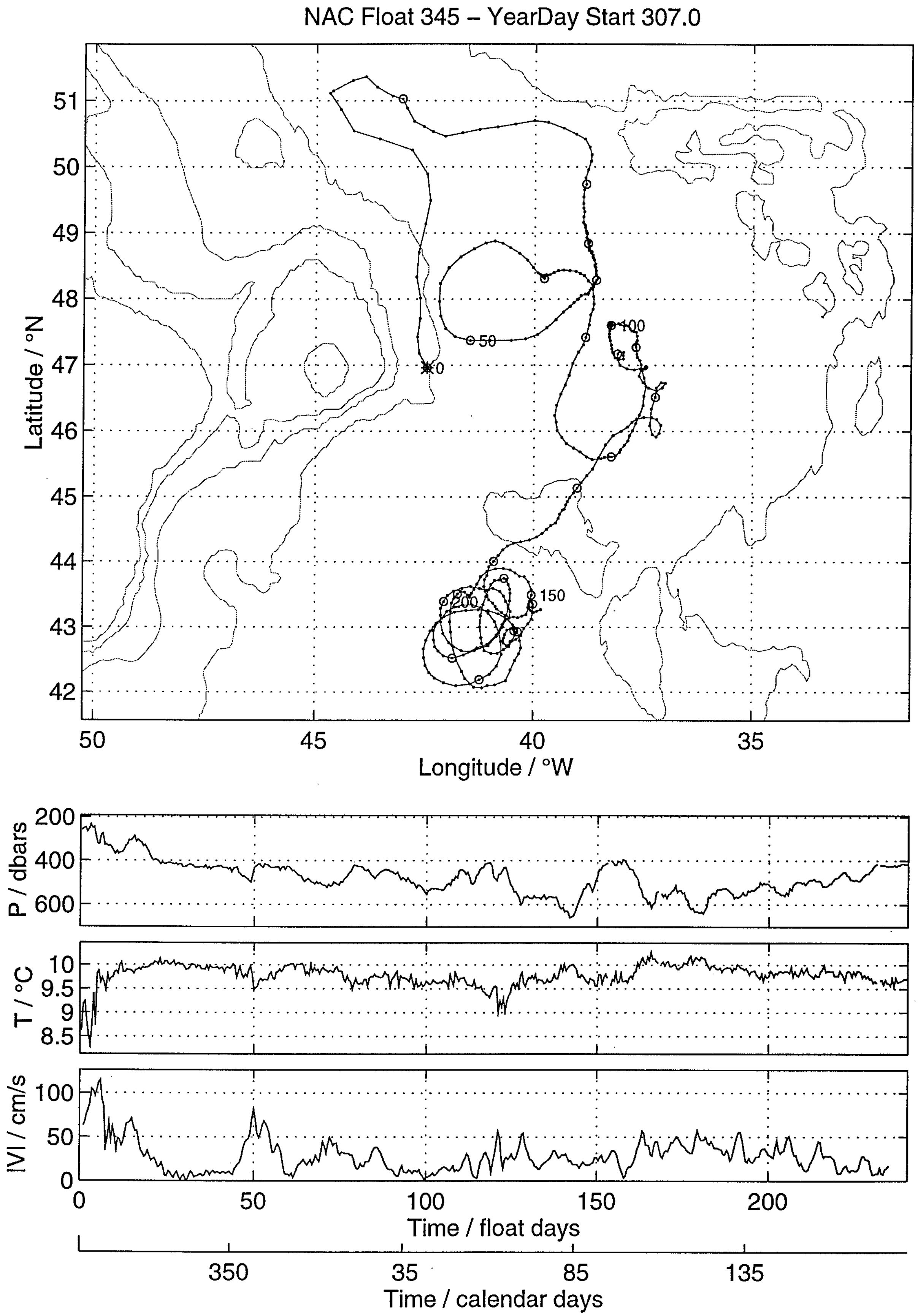


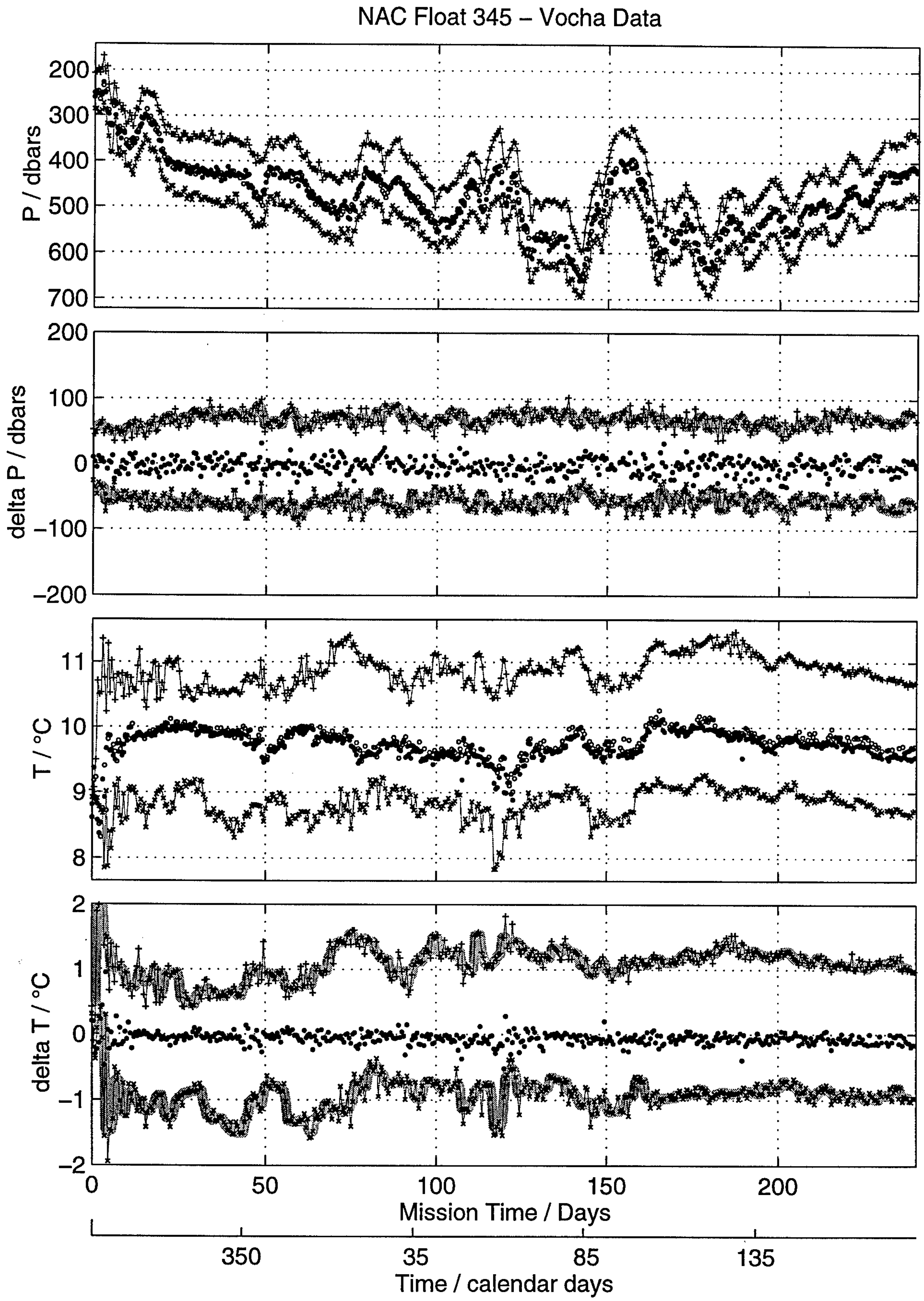
NAC Float 343 – YearDay Start 298.0
46
45
44
43
42
41
40
Latitude / °N
48
46
44
42
40
38
36
Longitude / °W
0
50
100
150
200
500
1000
P / dbars
7
6
T / °C
40
20
0
|V| / cm/s
0
50
100
150
200
Time / float days
300
350
35
85
135
Time / calendar days


NAC Float 343 – Vocha Data
P / dbars
400
600
800
1000
delta P / dbars
200
100
0
−100
−200
T / °C
8
7
6
5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
300
350
35
85
135
Time / calendar days


NAC Float 344 – YearDay Start 305.5
Latitude / °N
Longitude / °W
44
42
40
38
36
34
32
30
53
52
51
50
49
48
47
46
0
50
100
150
200
P / dbars
200
400
600
T / °C
10
8
|V| / cm/s
100
50
0
0
50
100
150
200
Time / float days
350
35
85
135
Time / calendar days

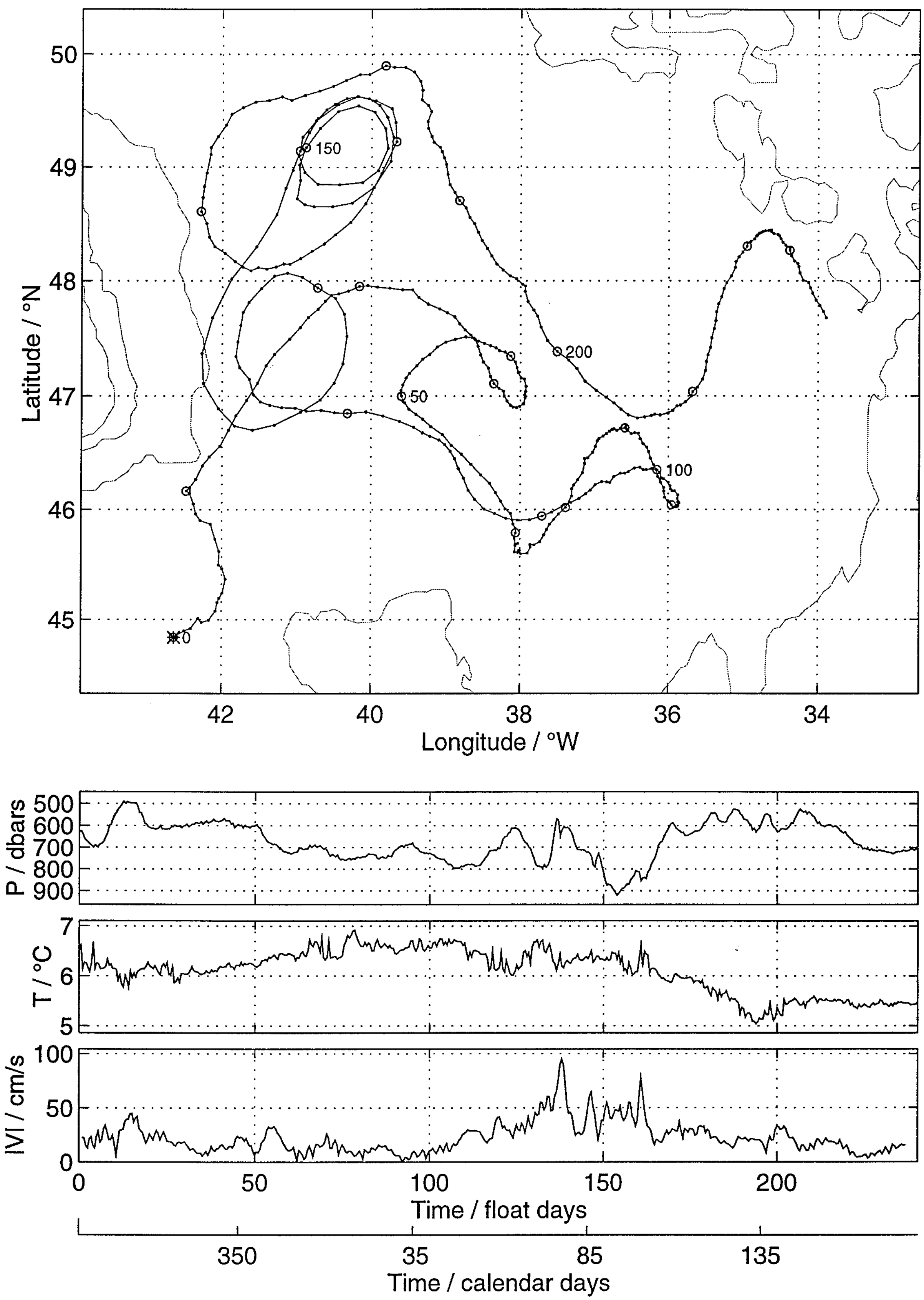

NAC Float 344 – Vocha Data
P / dbars
100
200
300
400
500
600
delta P / dbars
200
100
0
−100
−200
T / °C
12
10
8
6
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

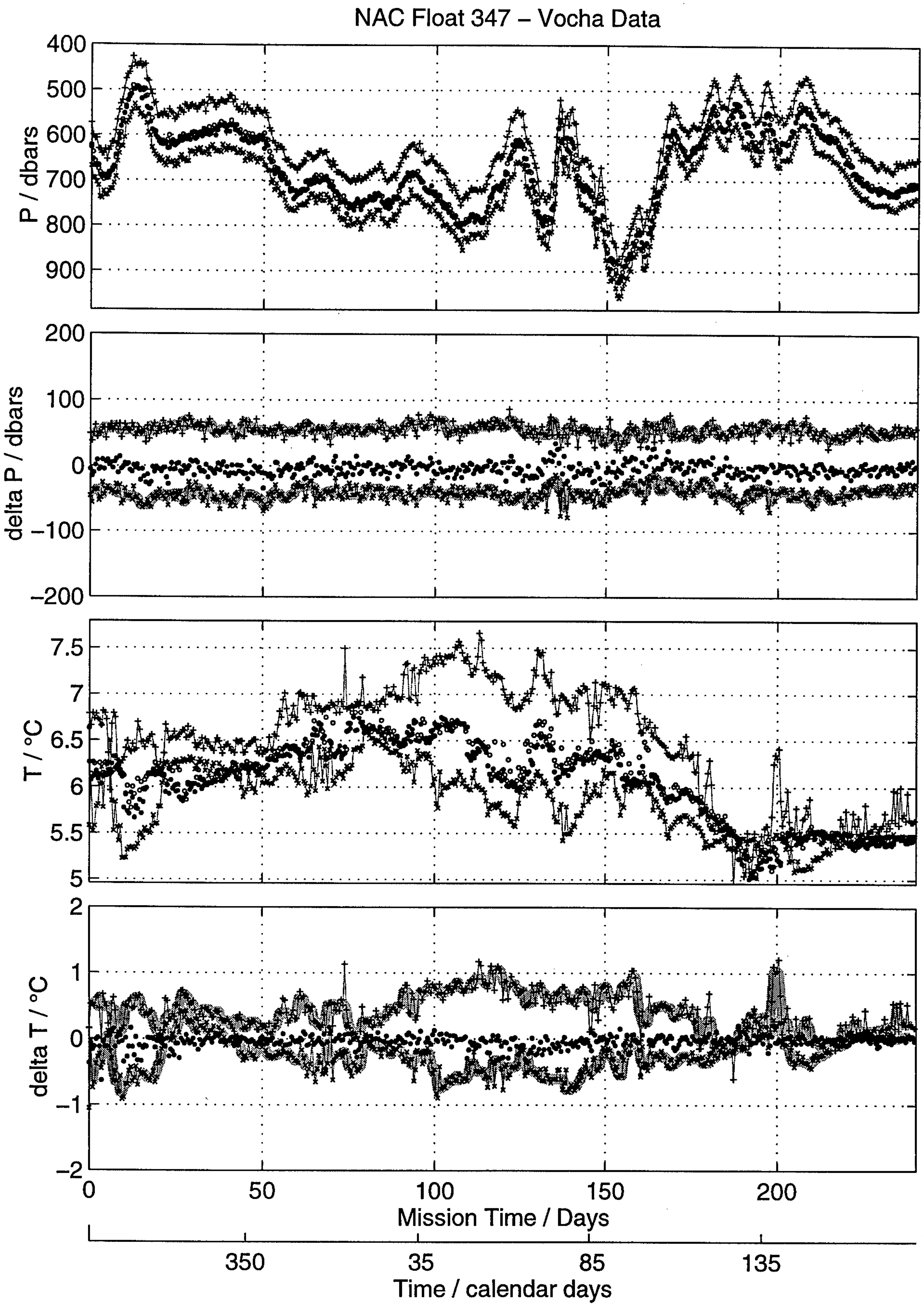

NAC Float 345 – YearDay Start 307.0
Latitude / °N
Longitude / °W
51
50
49
48
47
46
45
44
43
42
50
45
40
35
0
50
100
150
200
P / dbars
200
400
600
T / °C
10
9.5
9
8.5
|V| / cm/s
100
50
0
0
50
100
150
200
Time / float days
350
35
85
135
Time / calendar days

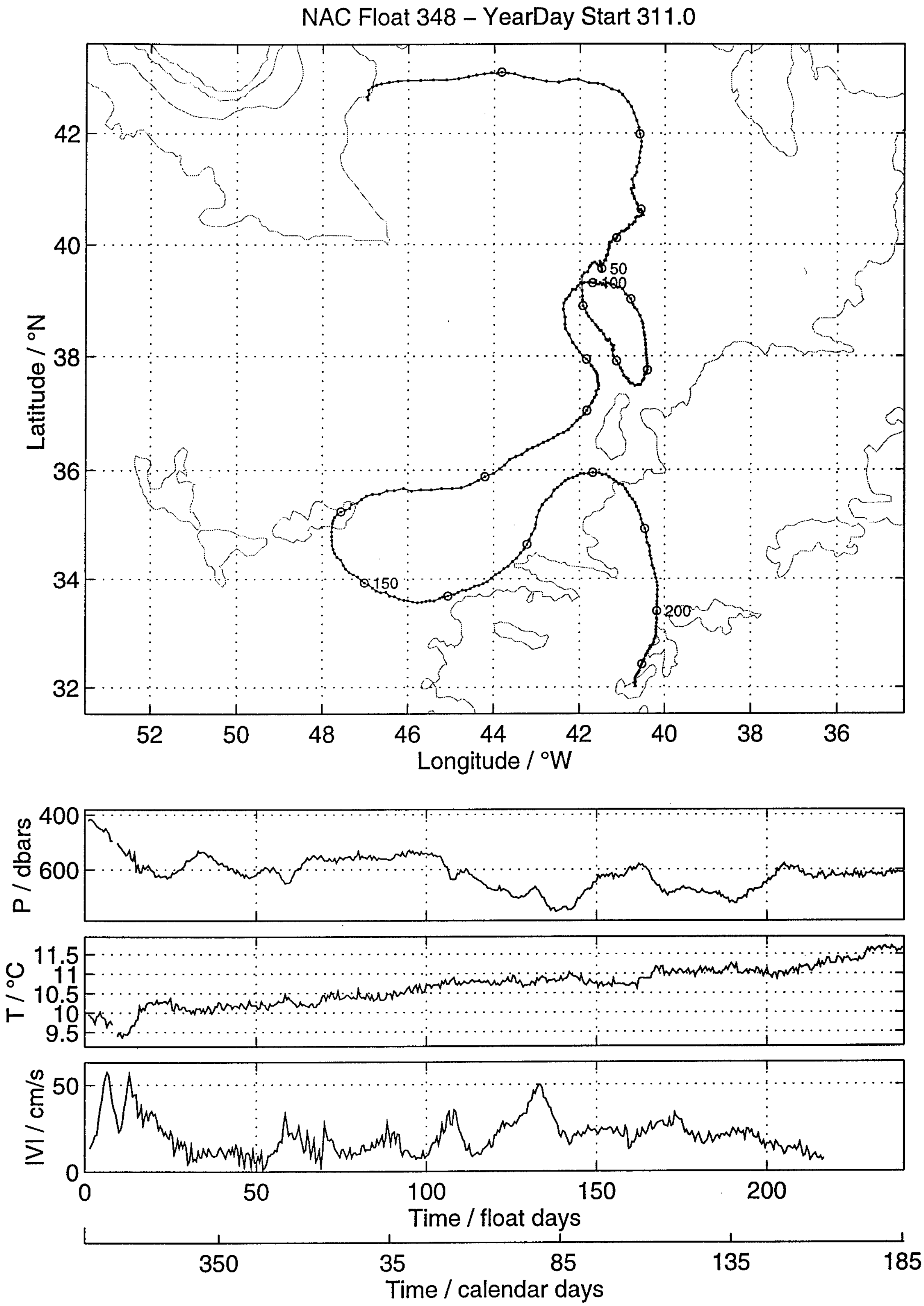


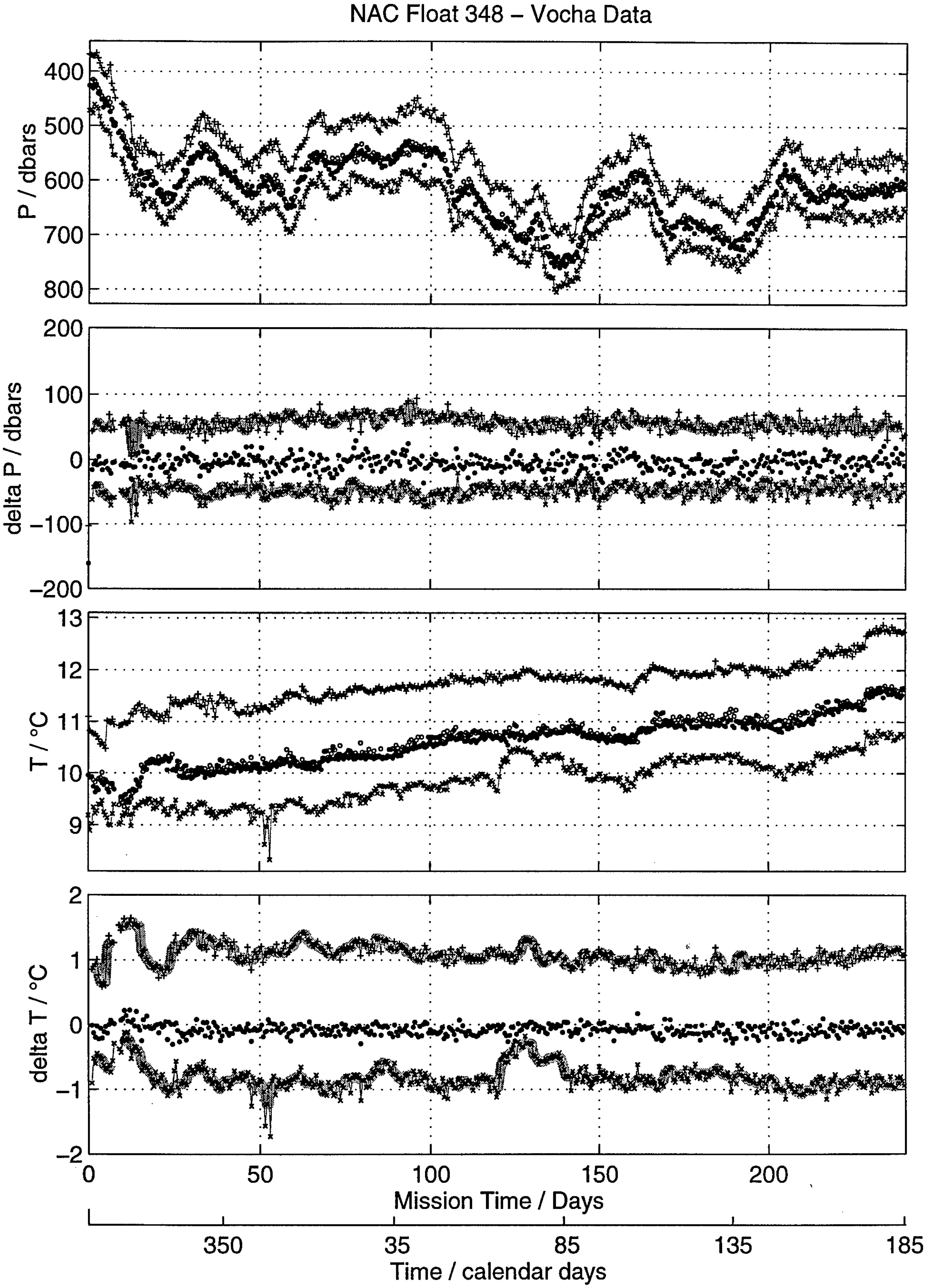
NAC Float 345 – Vocha Data
P / dbars
200
300
400
500
600
700
delta P / dbars
200
100
0
−100
−200
T / °C
11
10
9
8
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

NAC Float 347 – YearDay Start 305.0

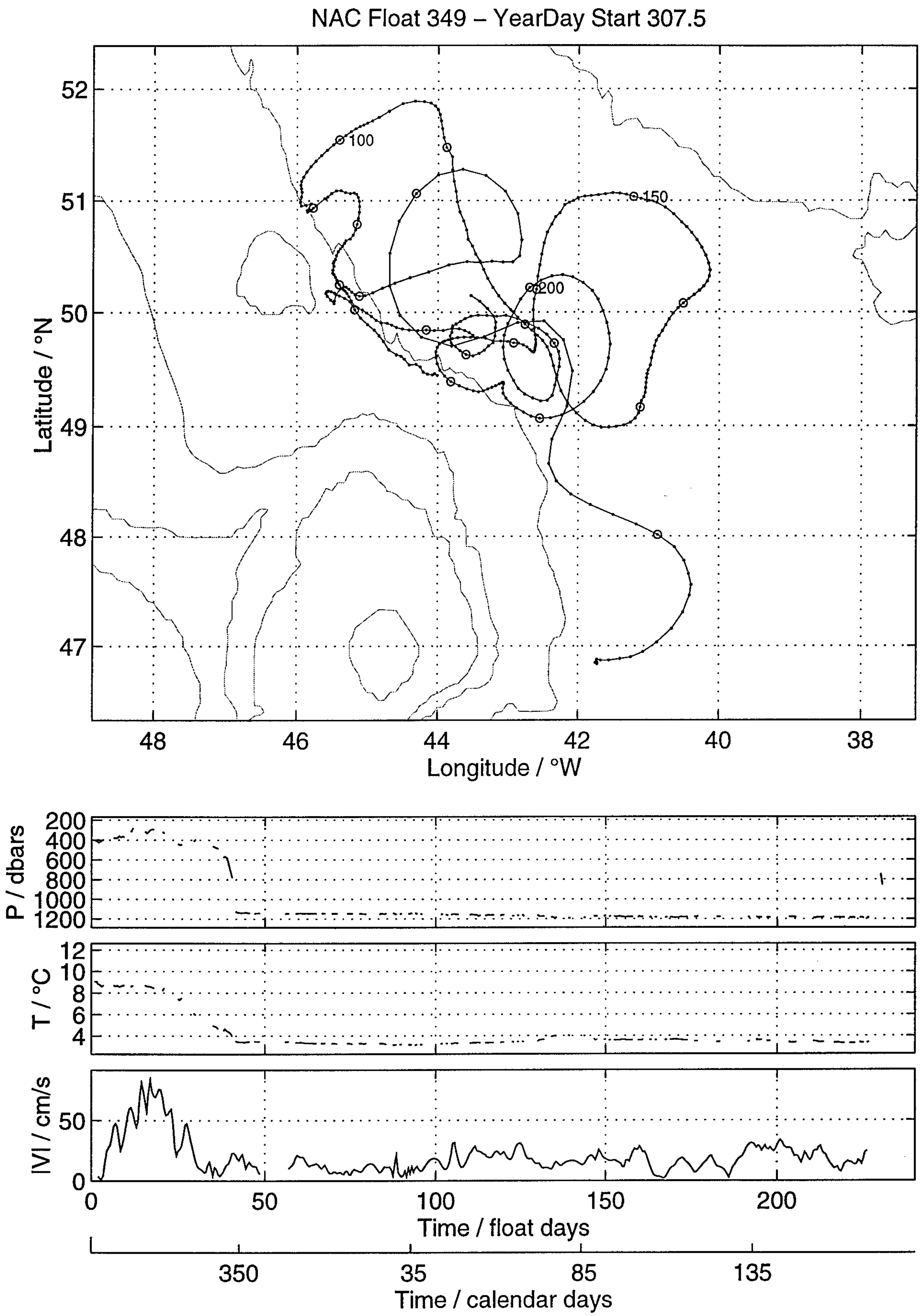


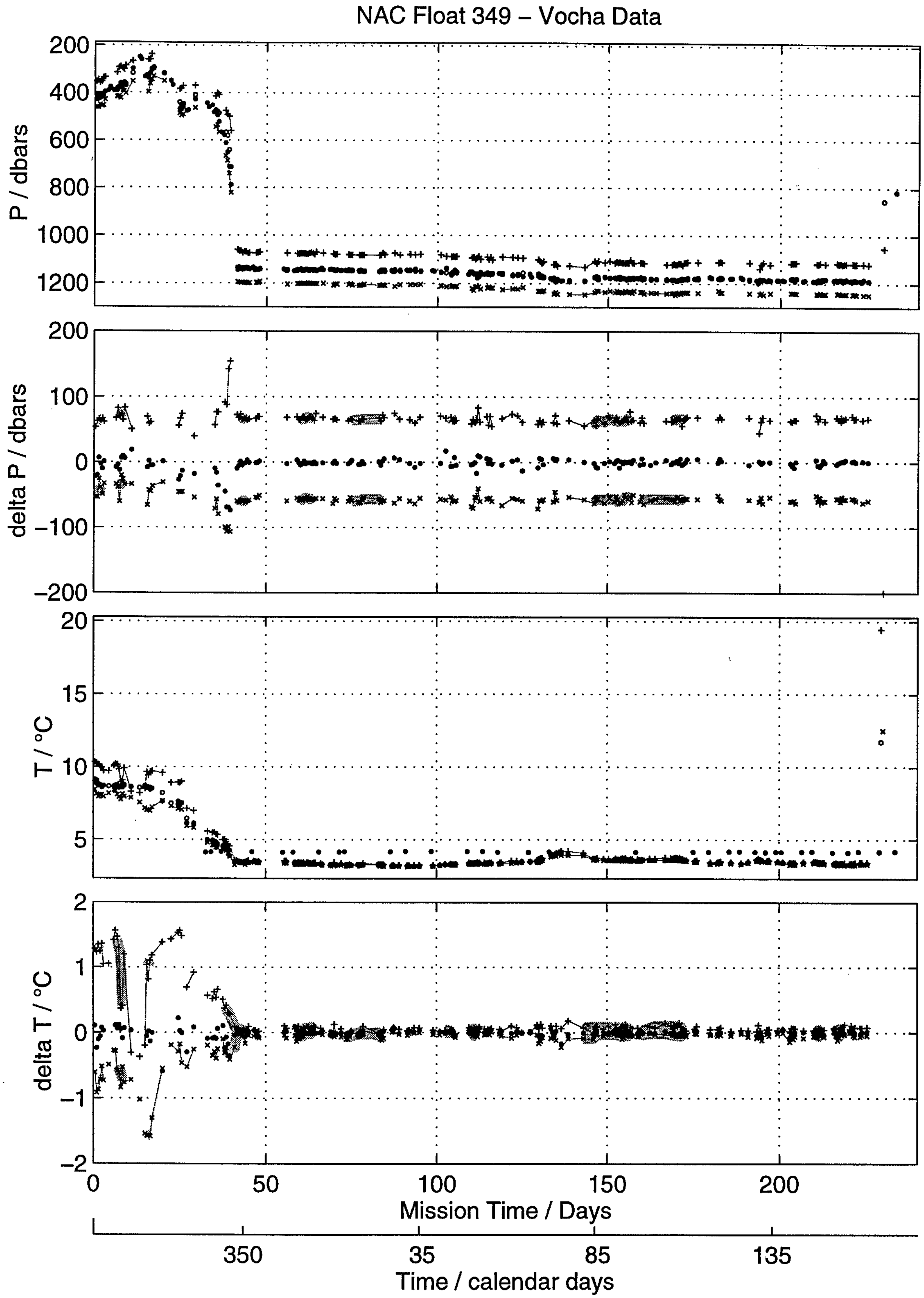

NAC Float 347 – Vocha Data
P / dbars
400
500
600
700
800
900
delta P / dbars
200
100
0
−100
−200
T / °C
7.5
7
6.5
6
5.5
5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

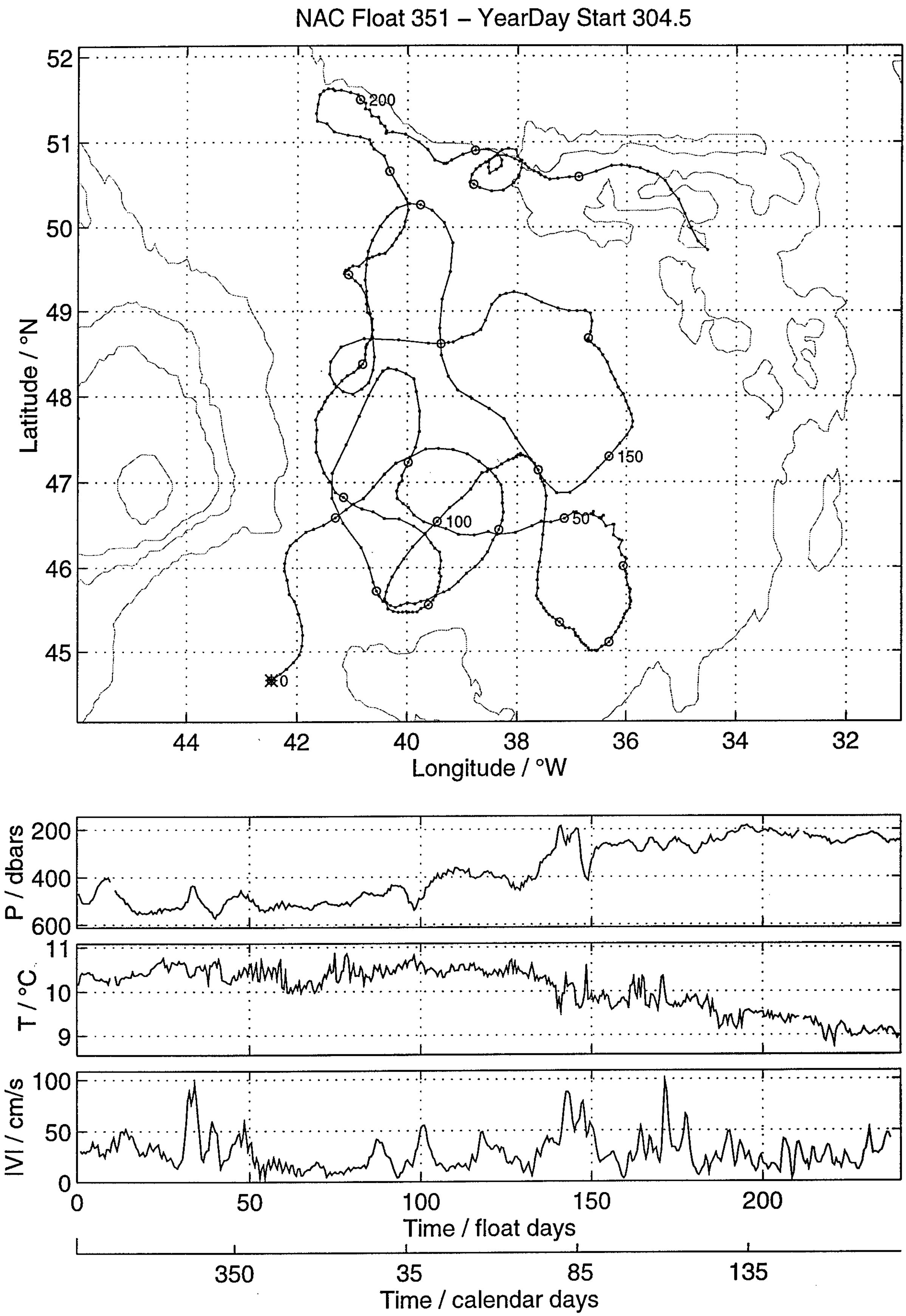

NAC Float 348 – YearDay Start 311.0
Latitude / °N
42
40
38
36
34
32
52
50
48
46
44
42
40
38
36
Longitude / °W
50
100
150
200
P / dbars
400
600
T / °C
11.5
11
10.5
10
9.5
|V| / cm/s
50
0
0
50
100
150
200
Time / float days
350
35
85
135
185
Time / calendar days



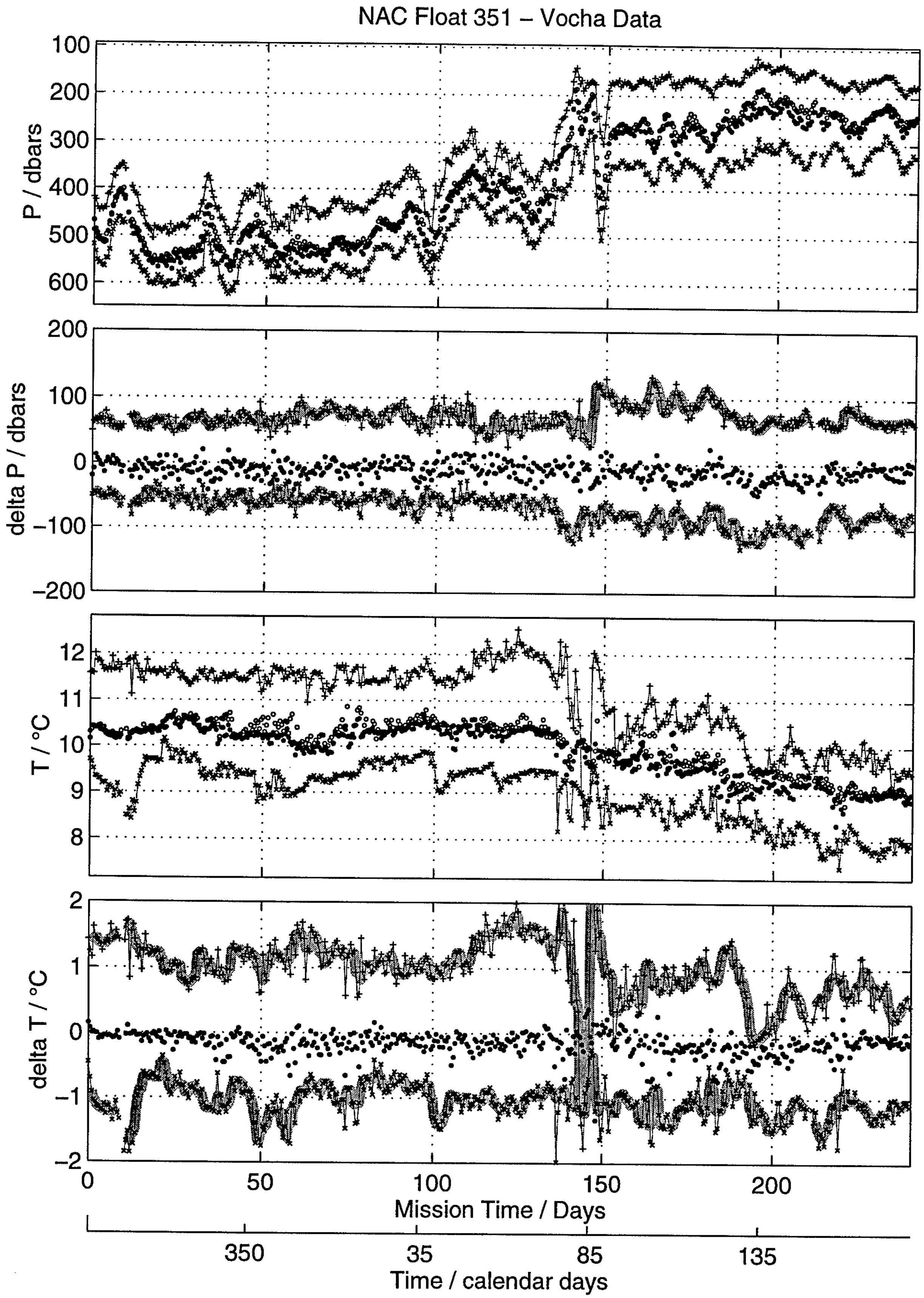
NAC Float 348 – Vocha Data
P / dbars
400
500
600
700
800
delta P / dbars
200
100
0
−100
−200
T / °C
13
12
11
10
9
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
185
Time / calendar days

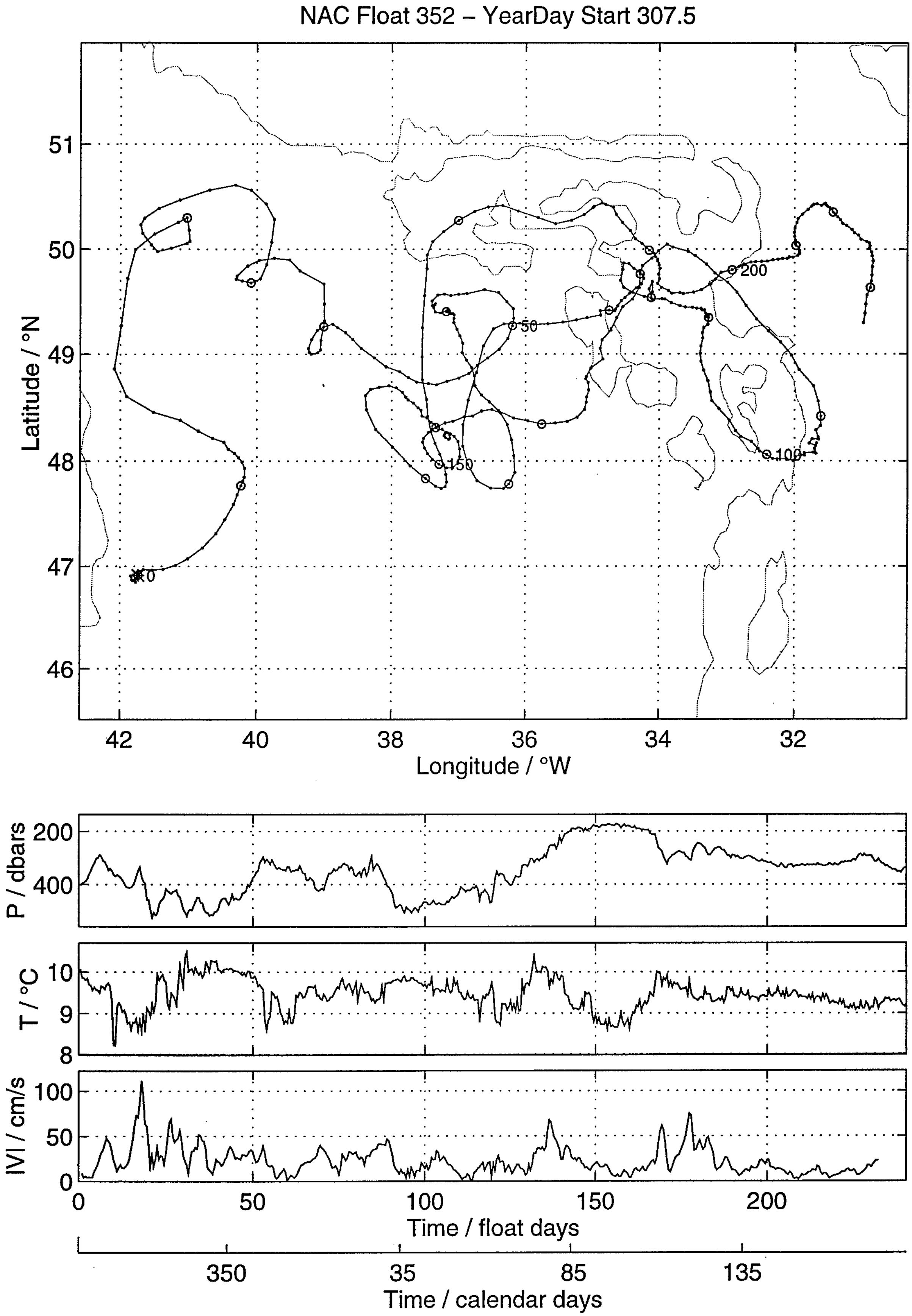

NAC Float 349 – YearDay Start 307.5
Latitude / °N
Longitude / °W
100
150
200
52
51
50
49
48
47
48
46
44
42
40
38
P / dbars
200
400
600
800
1000
1200
T / °C
12
10
8
6
4
|V| / cm/s
50
0
0
50
100
150
200
Time / float days
350
35
85
135
Time / calendar days

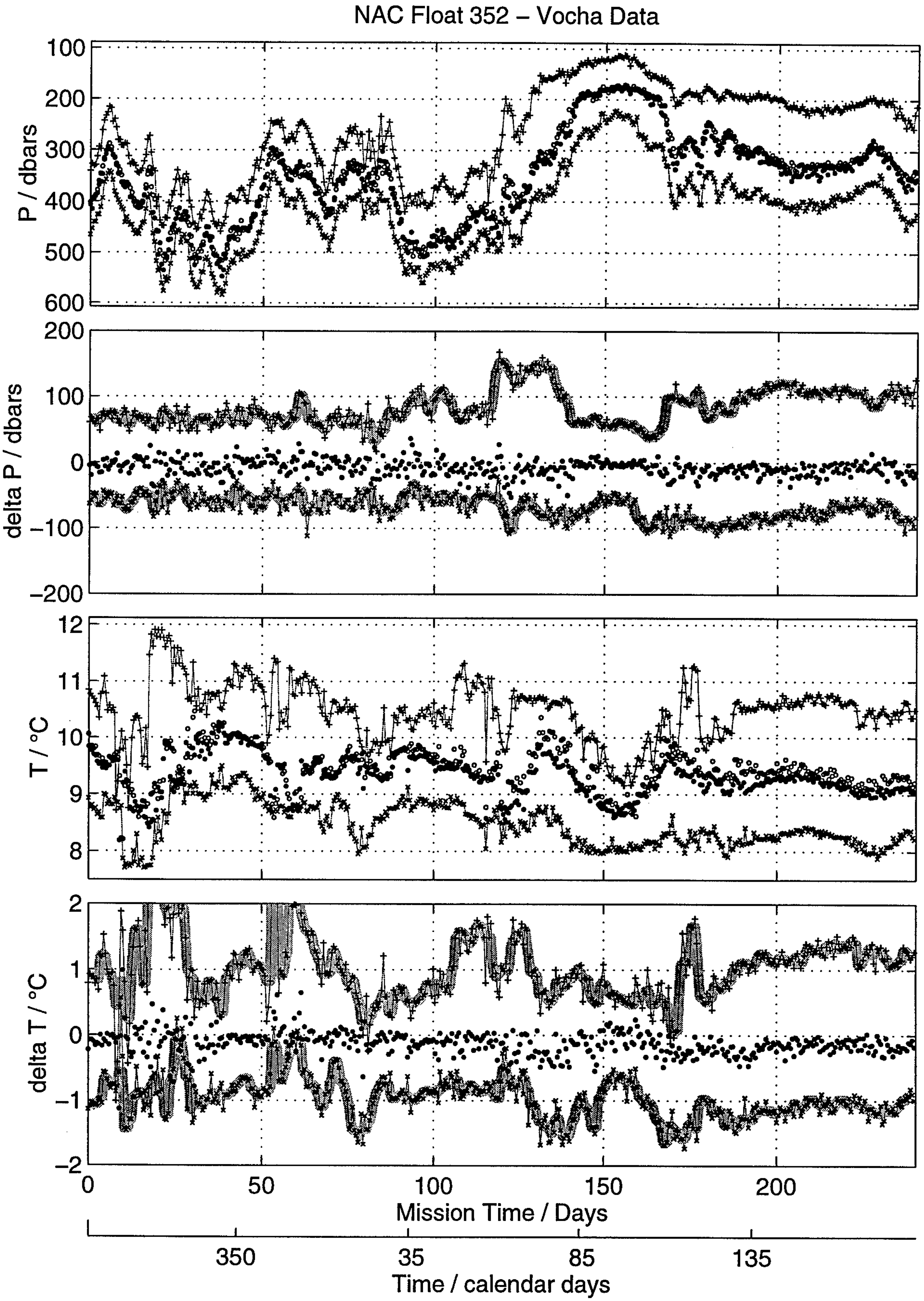

NAC Float 349 – Vocha Data
P / dbars
200
400
600
800
1000
1200
delta P / dbars
200
100
0
−100
−200
T / °C
20
15
10
5
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days



NAC Float 351 – YearDay Start 304.5
Latitude / °N
Longitude / °W
52
51
50
49
48
47
46
45
44
42
40
38
36
34
32
200
150
100
50
0
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days
350
35
85
135

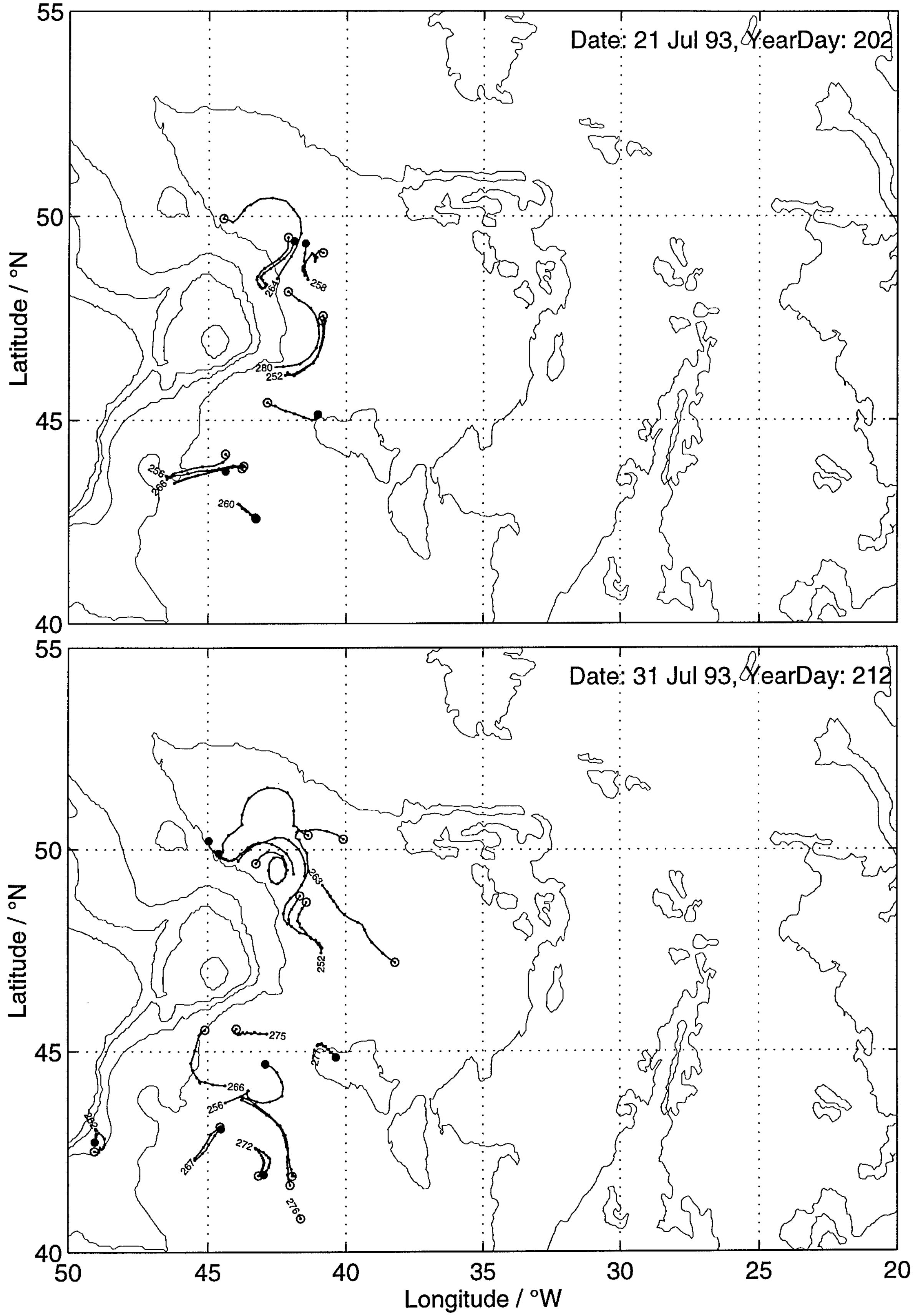

NAC Float 351 – Vocha Data
P / dbars
100
200
300
400
500
600
delta P / dbars
200
100
0
−100
−200
T / °C
12
11
10
9
8
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

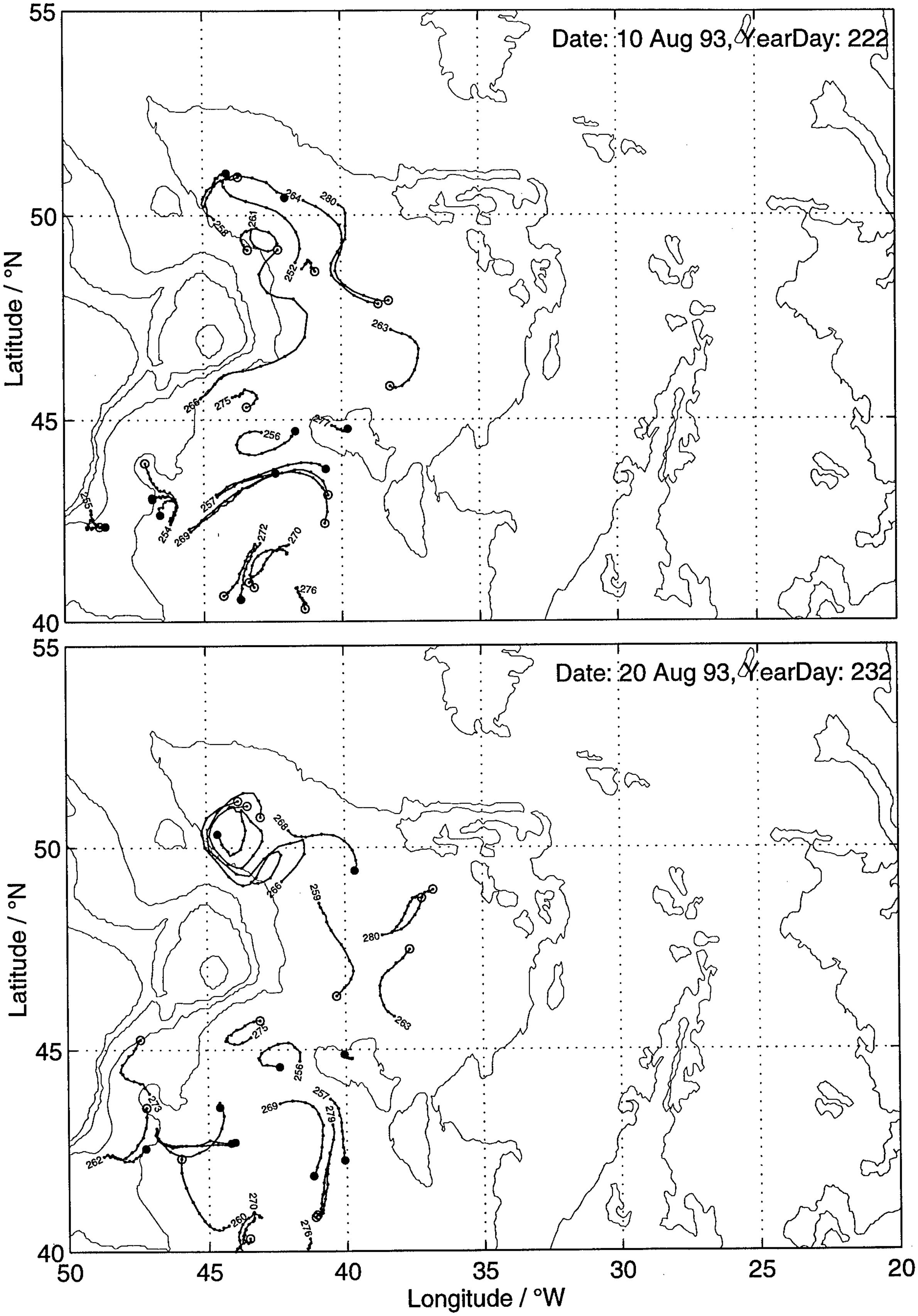

NAC Float 352 – YearDay Start 307.5
Latitude / °N
Longitude / °W
P / dbars
T / °C
|V| / cm/s
Time / float days
Time / calendar days



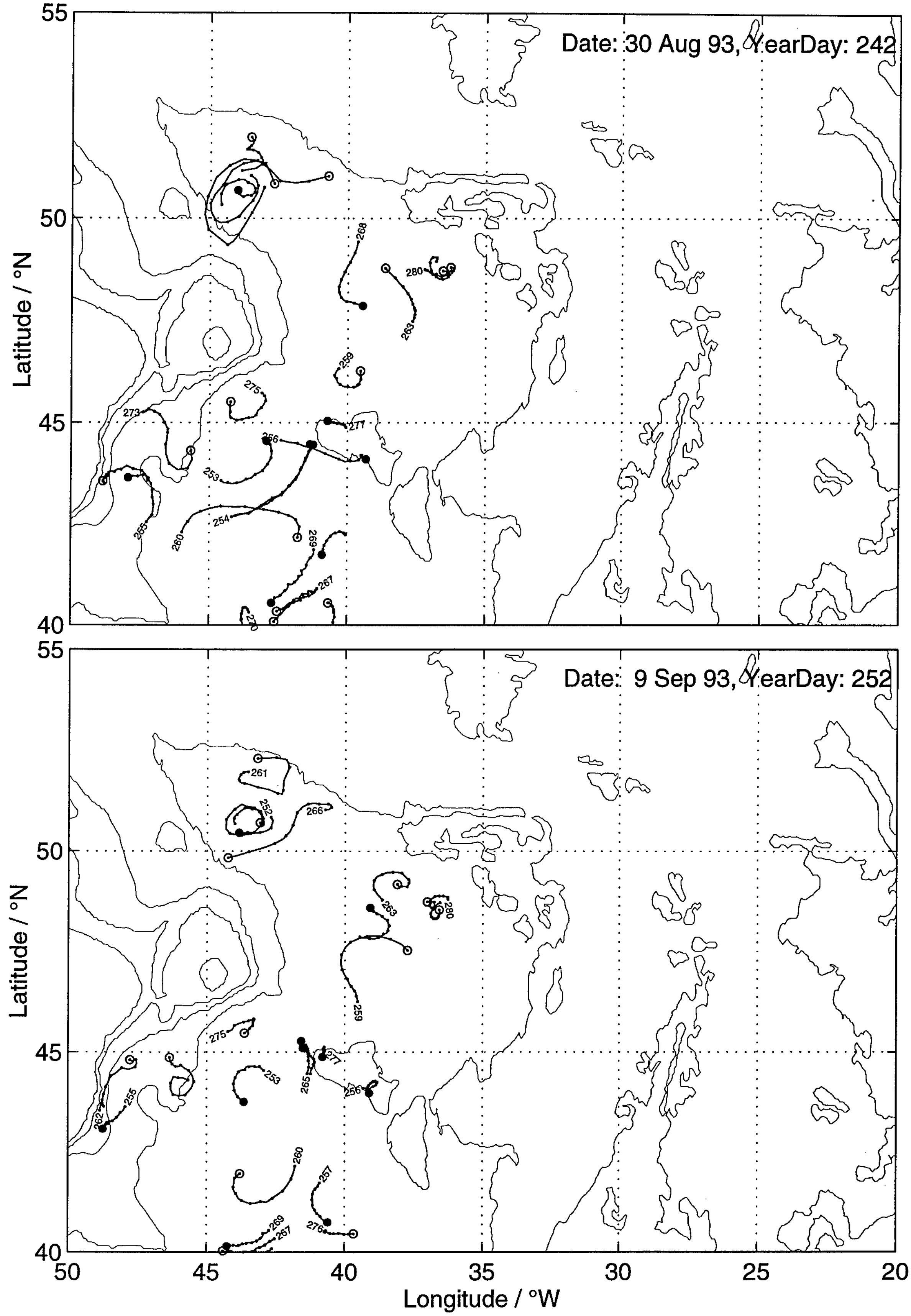
NAC Float 352 – Vocha Data
P / dbars
100
200
300
400
500
600
delta P / dbars
200
100
0
−100
−200
T / °C
12
11
10
9
8
delta T / °C
2
1
0
−1
−2
0
50
100
150
200
Mission Time / Days
350
35
85
135
Time / calendar days

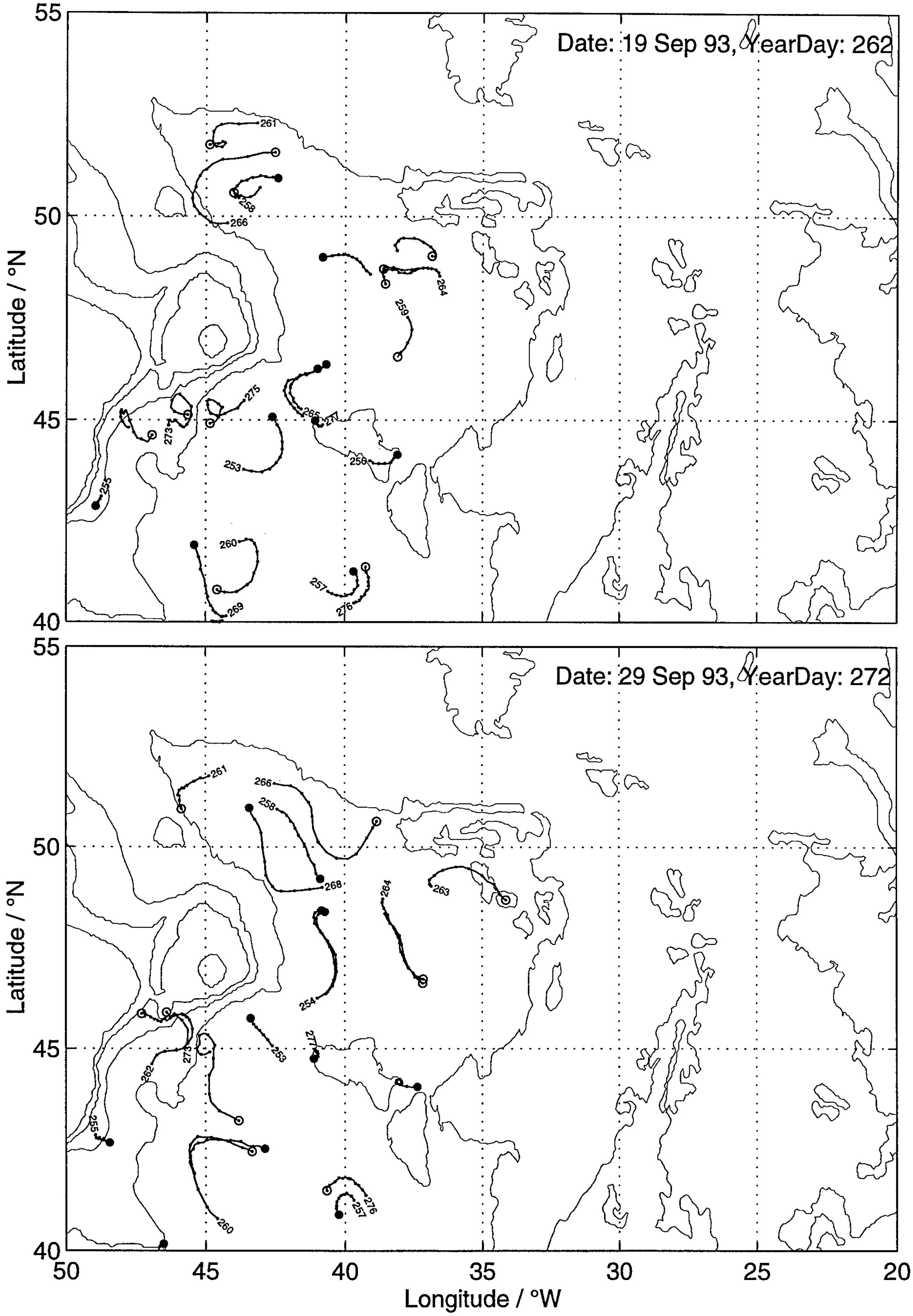
10. RAFOS Float Time Series Plots

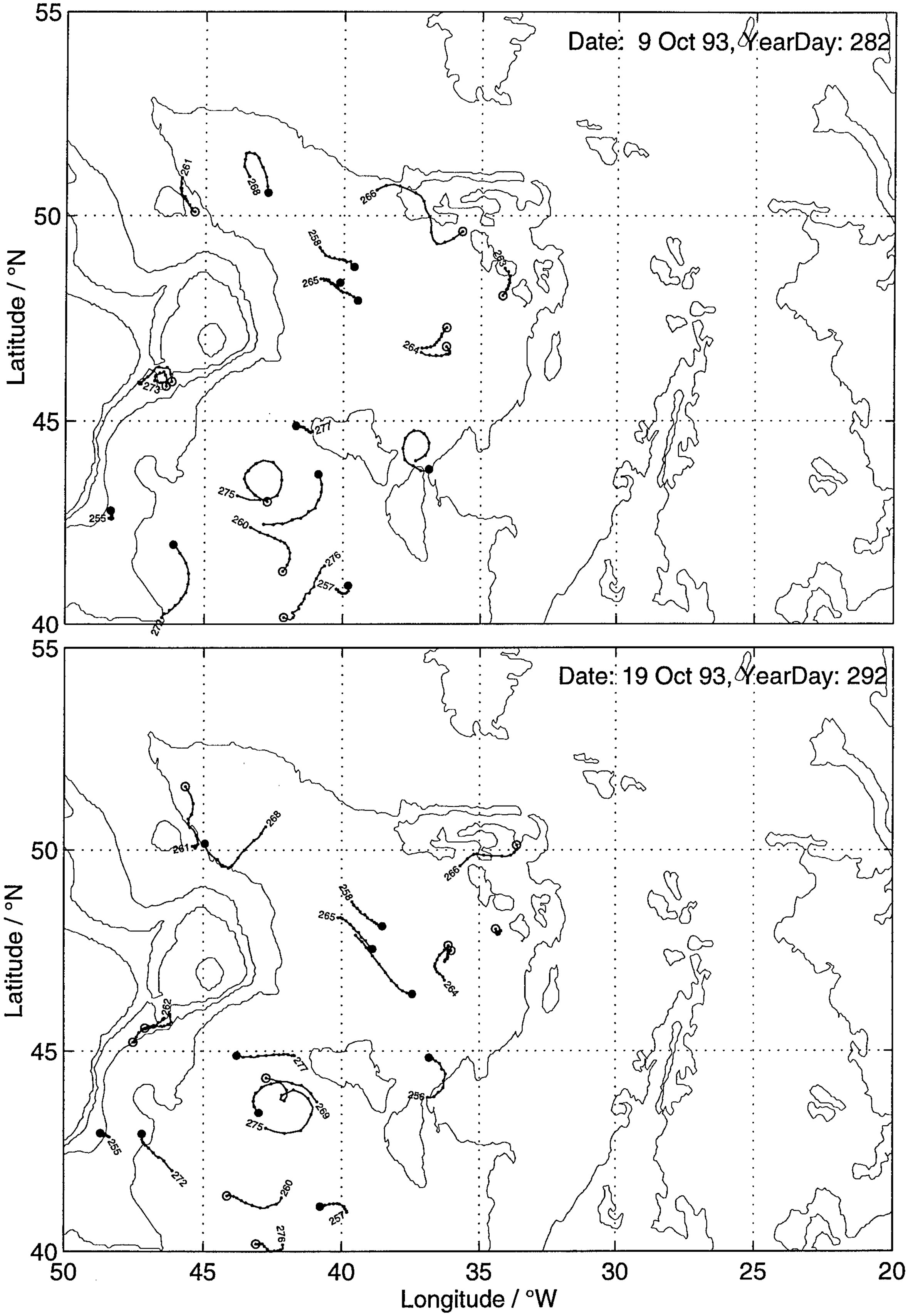

Date: 21 Jul 93, YearDay: 202
Date: 31 Jul 93, YearDay: 212
Latitude / °N
Longitude / °W
55
50
45
40
20
25
30
35
264
258
280
252
256
266
260
263
275
272
267
276

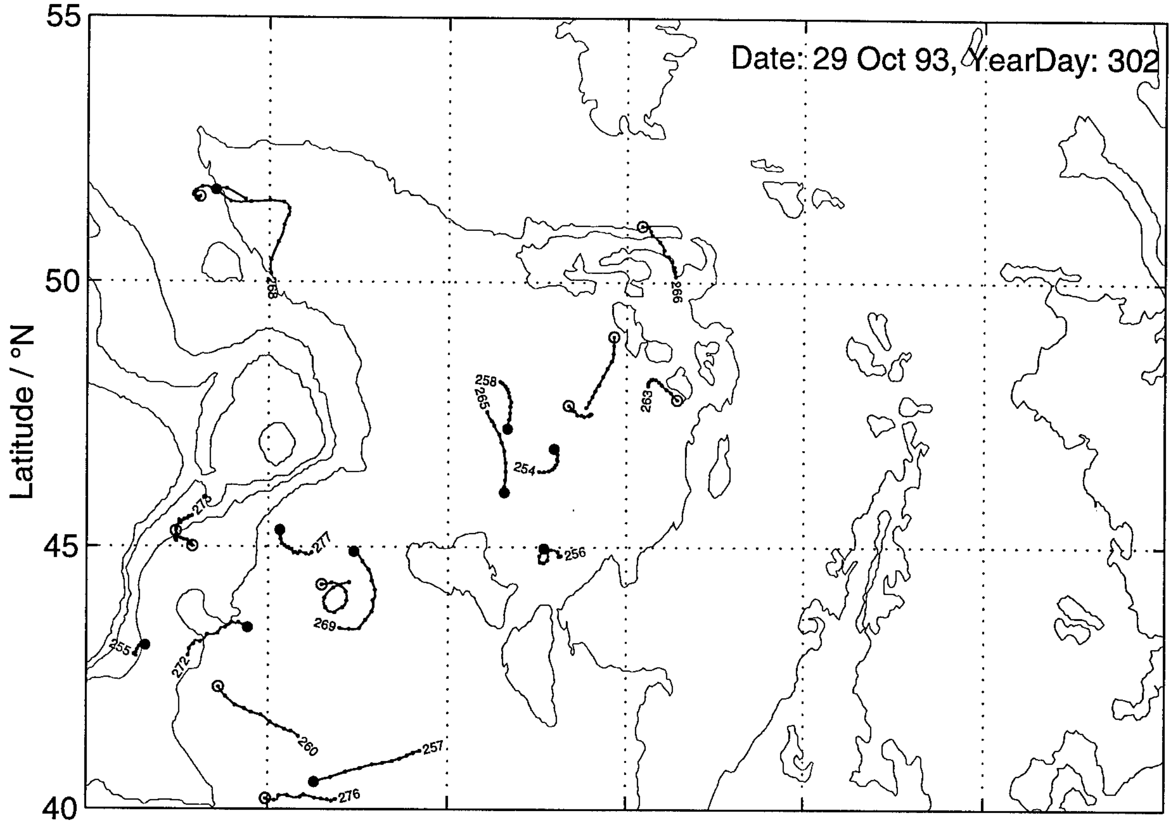


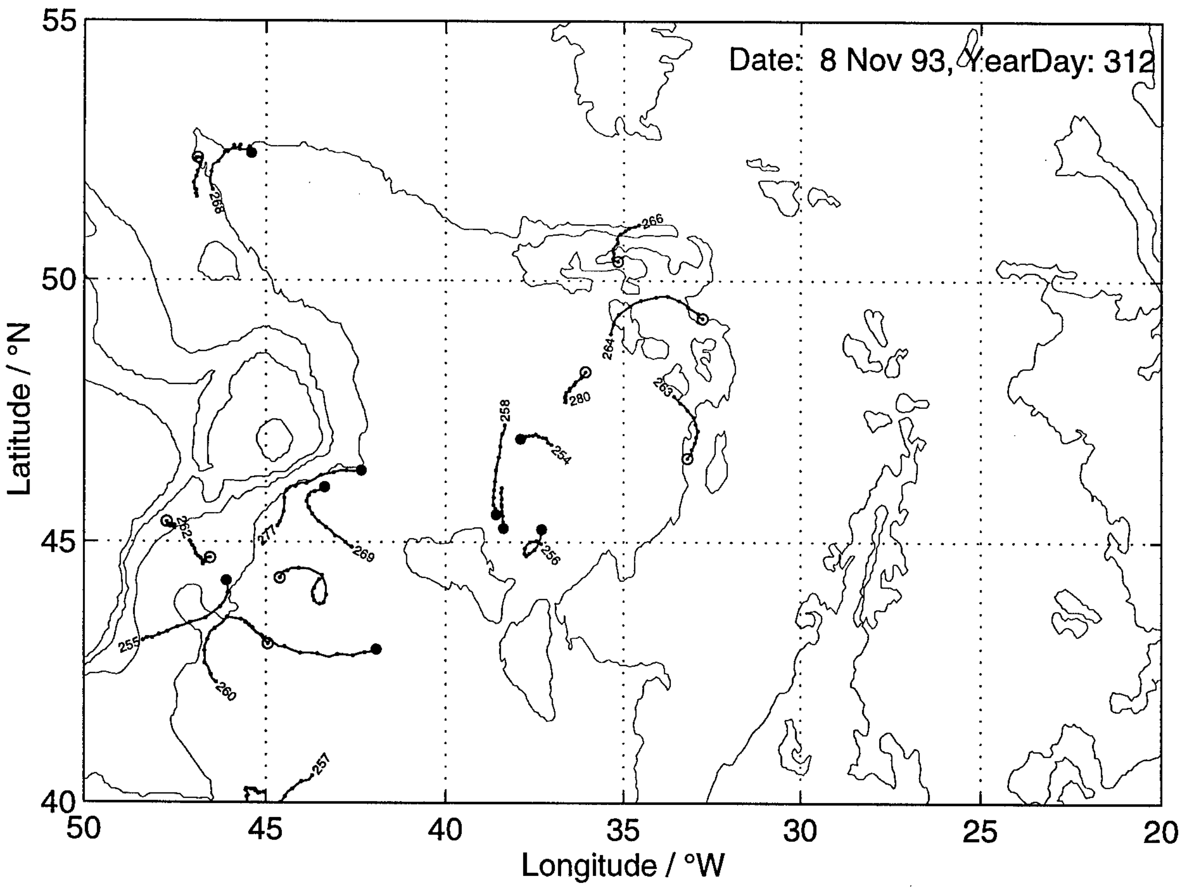
Date: 10 Aug 93, YearDay: 222
Date: 20 Aug 93, YearDay: 232
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

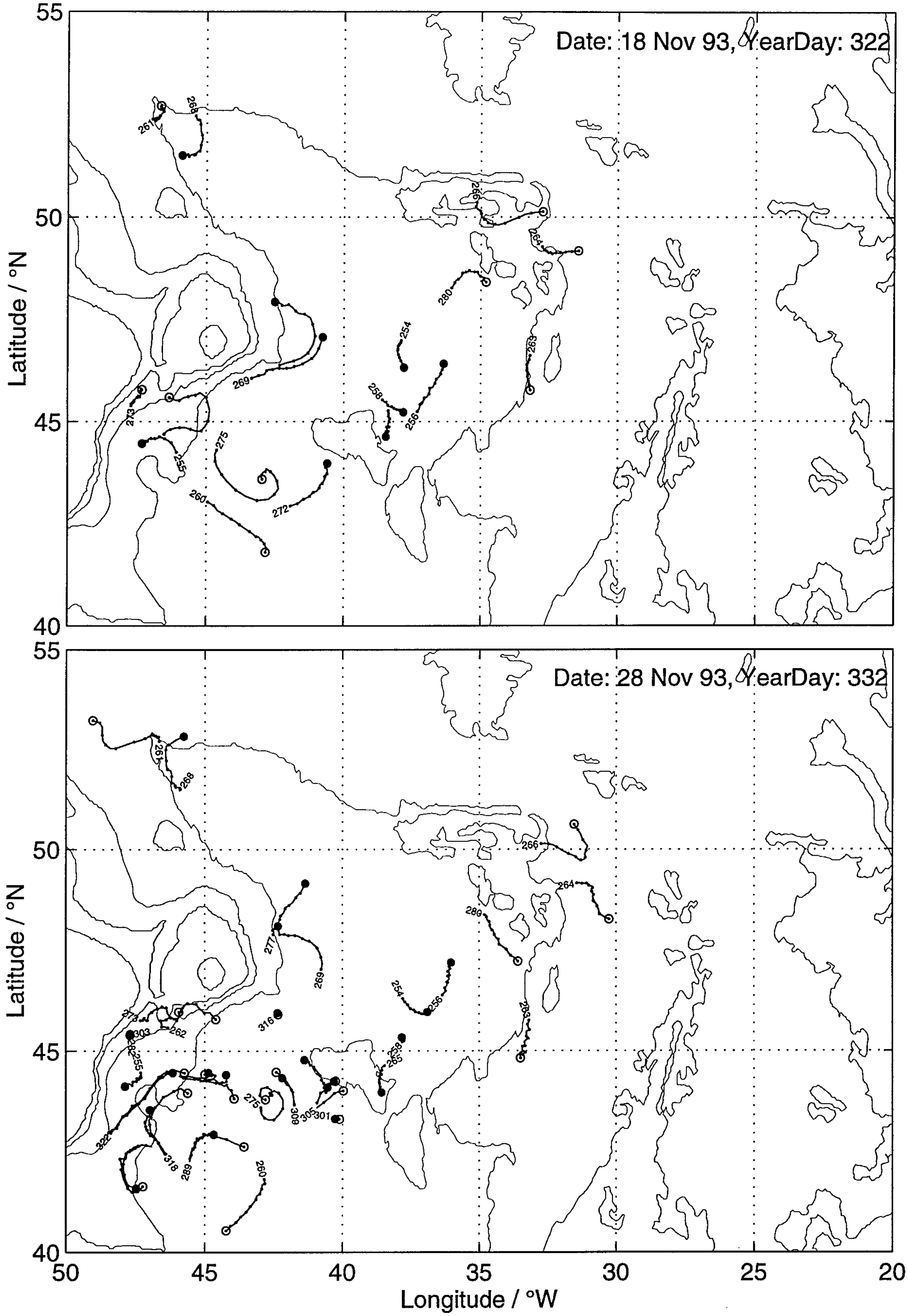

Date: 30 Aug 93, YearDay: 242
Date: 9 Sep 93, YearDay: 252
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

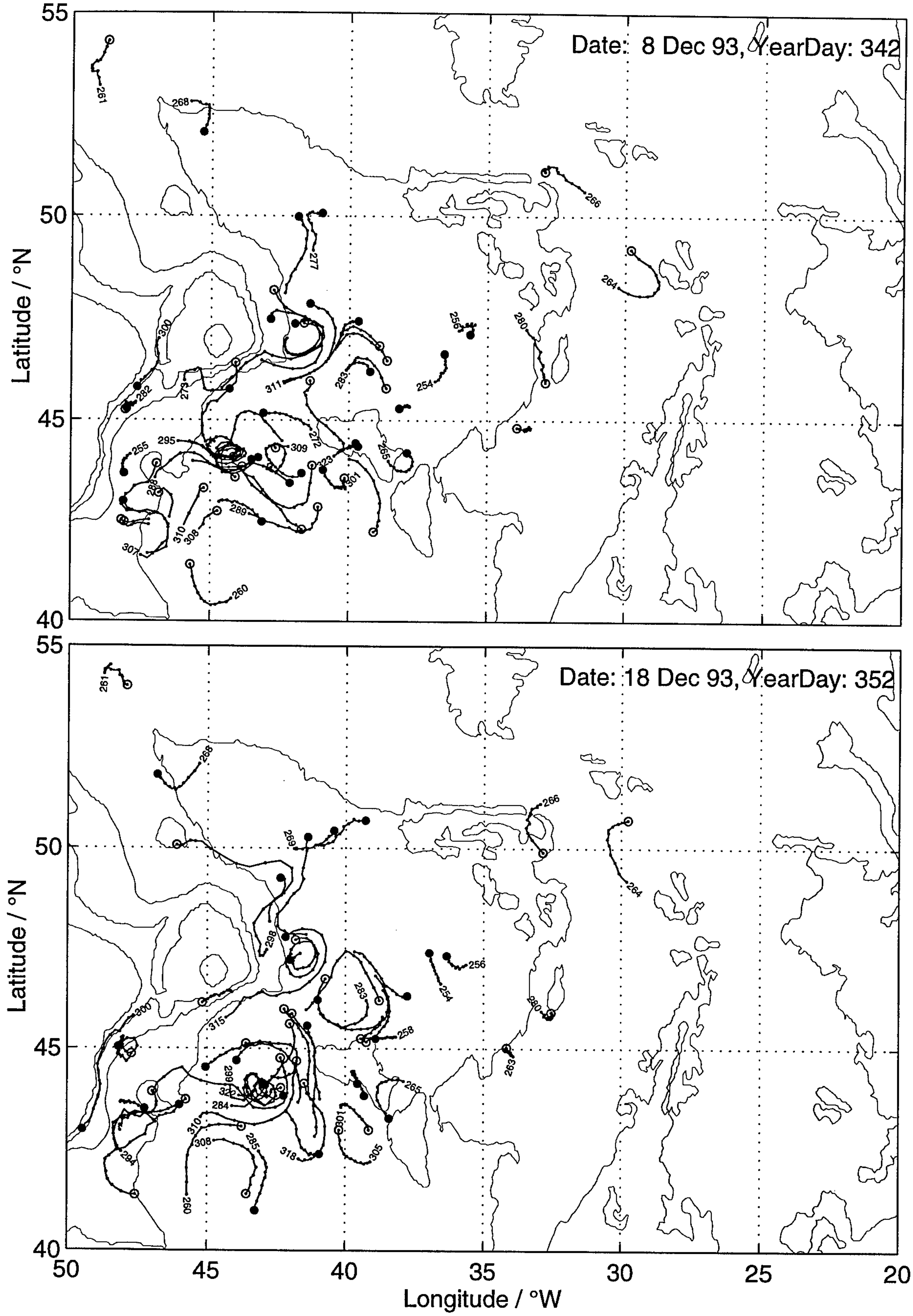

Date: 19 Sep 93, YearDay: 262
Date: 29 Sep 93, YearDay: 272
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

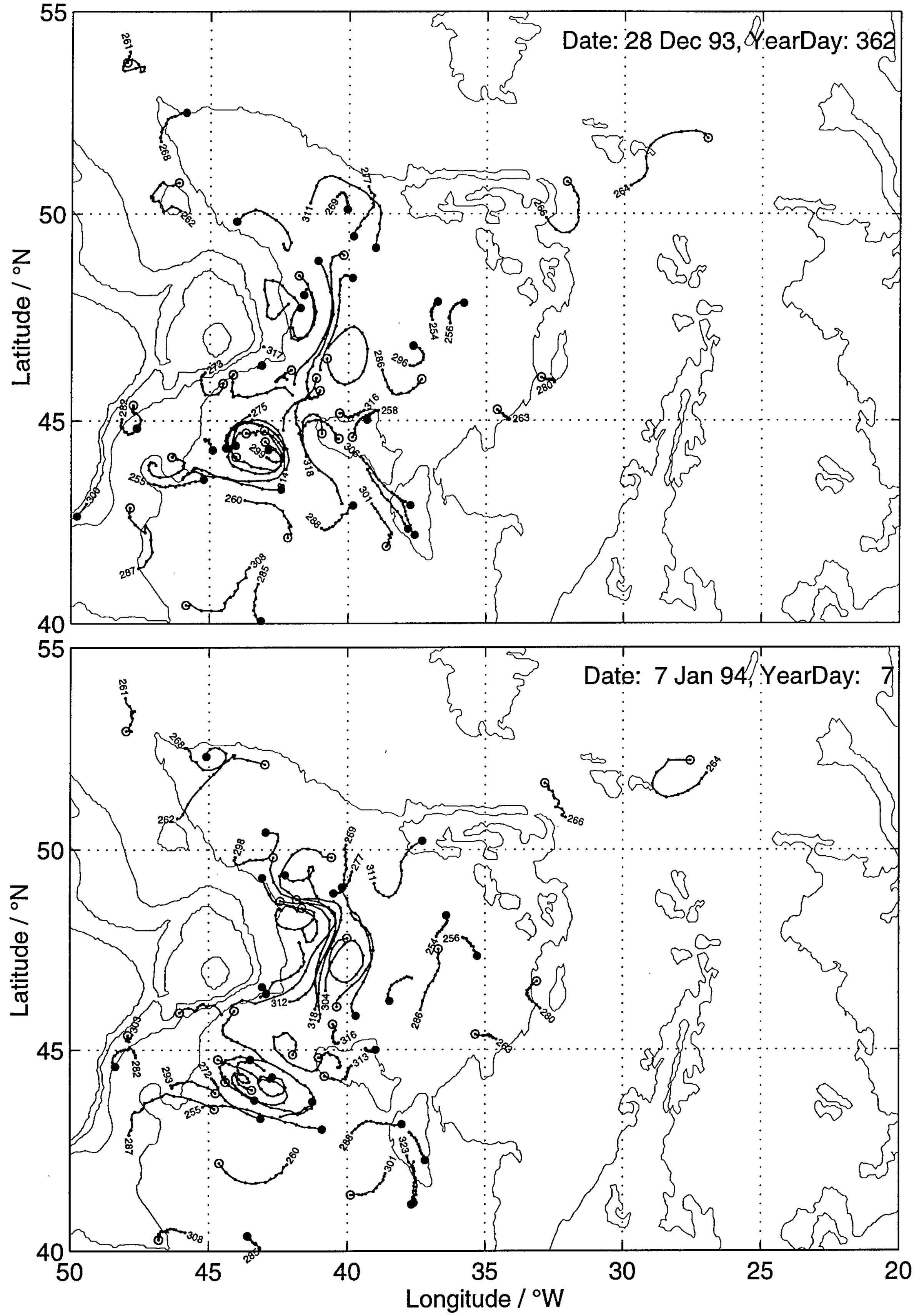

Date: 9 Oct 93, YearDay: 282
Date: 19 Oct 93, YearDay: 292
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20


Date: 29 Oct 93, YearDay: 302
Latitude / °N
55
50
45
40
268
266
258
265
263
254
273
277
256
269
255
272
260
257
276

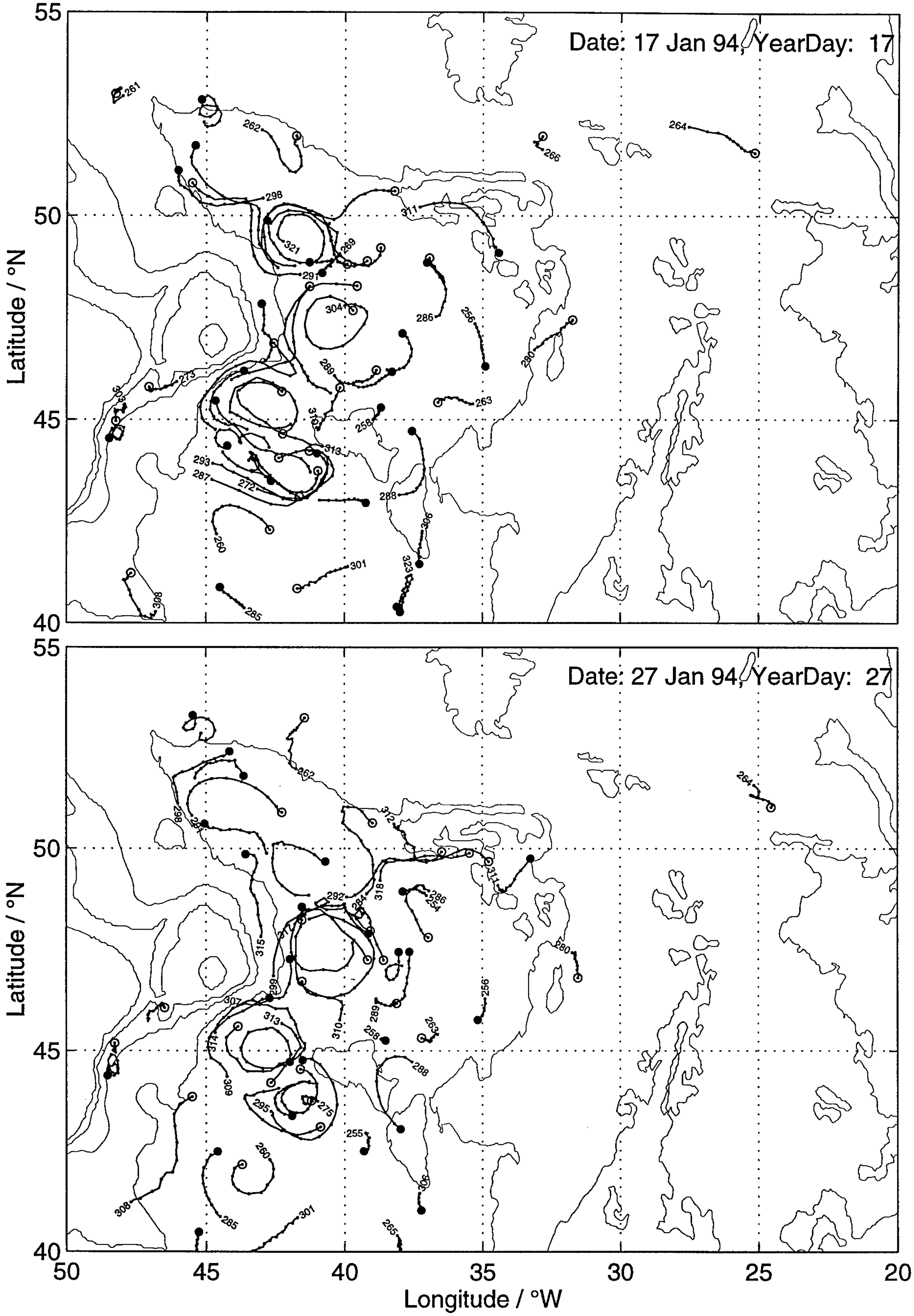

Date: 8 Nov 93, YearDay: 312
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20
268
266
264
280
263
258
254
262
277
269
256
255
260
257

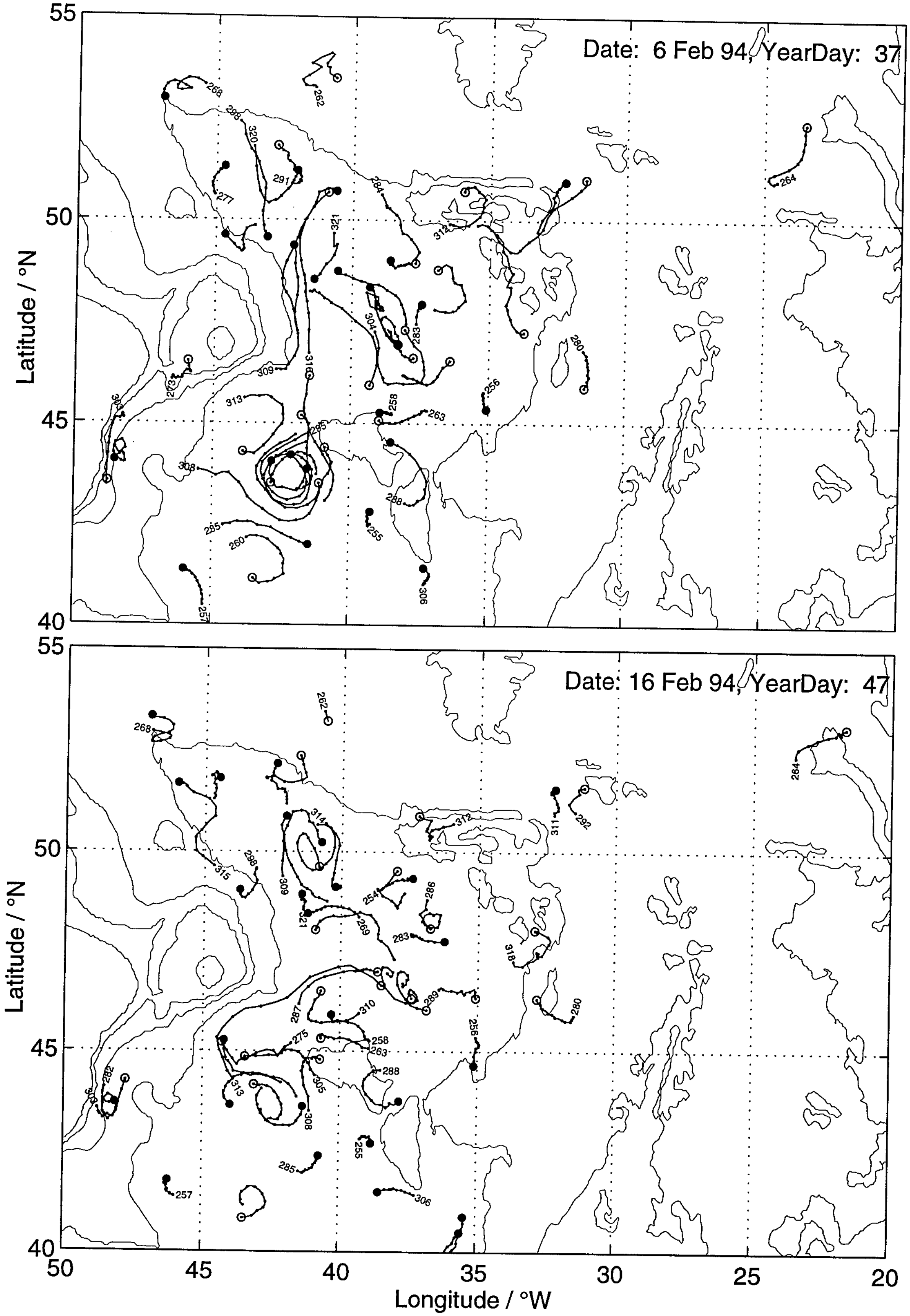

Date: 18 Nov 93, YearDay: 322
Date: 28 Nov 93, YearDay: 332
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

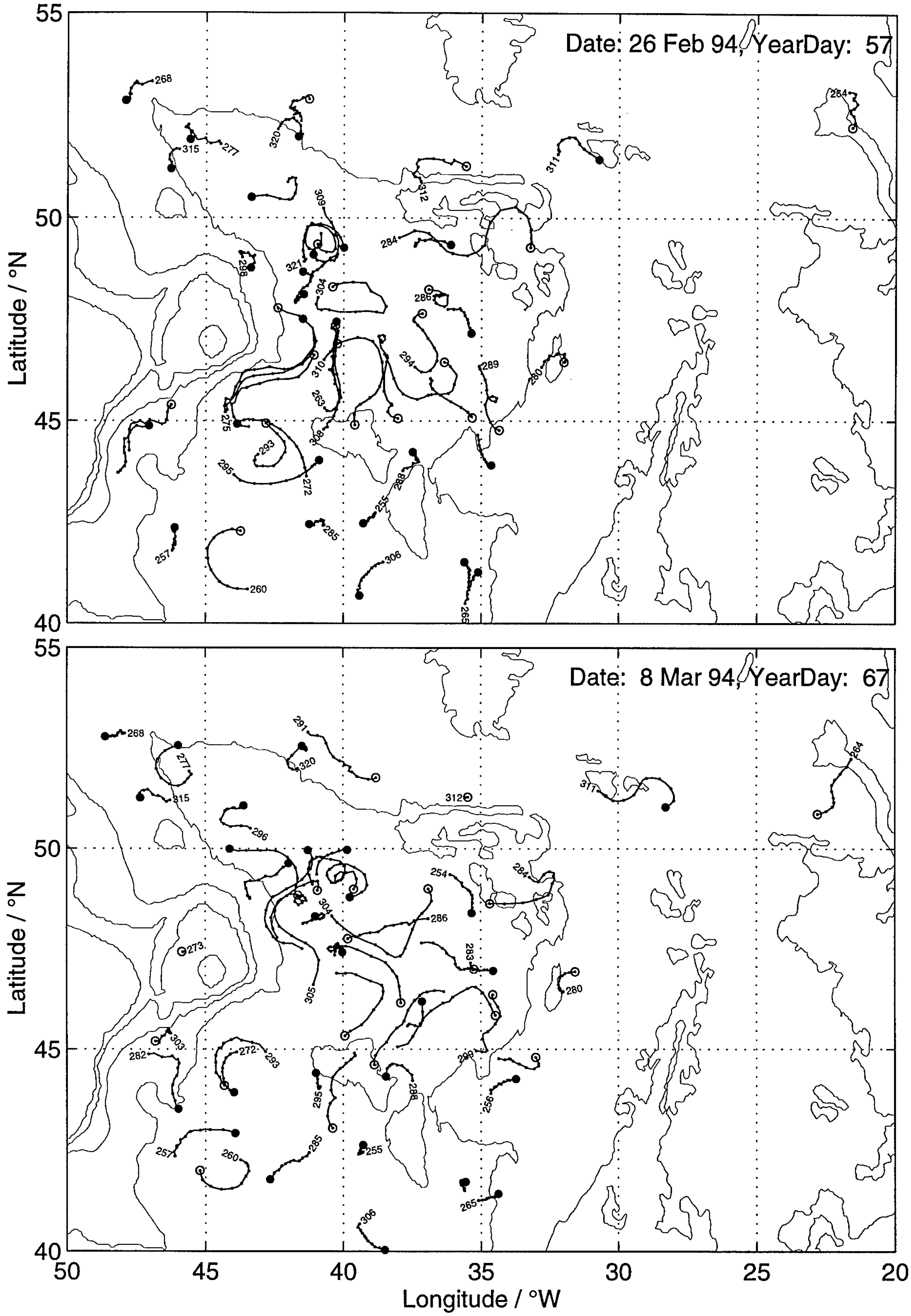

Date: 8 Dec 93, YearDay: 342
Date: 18 Dec 93, YearDay: 352
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

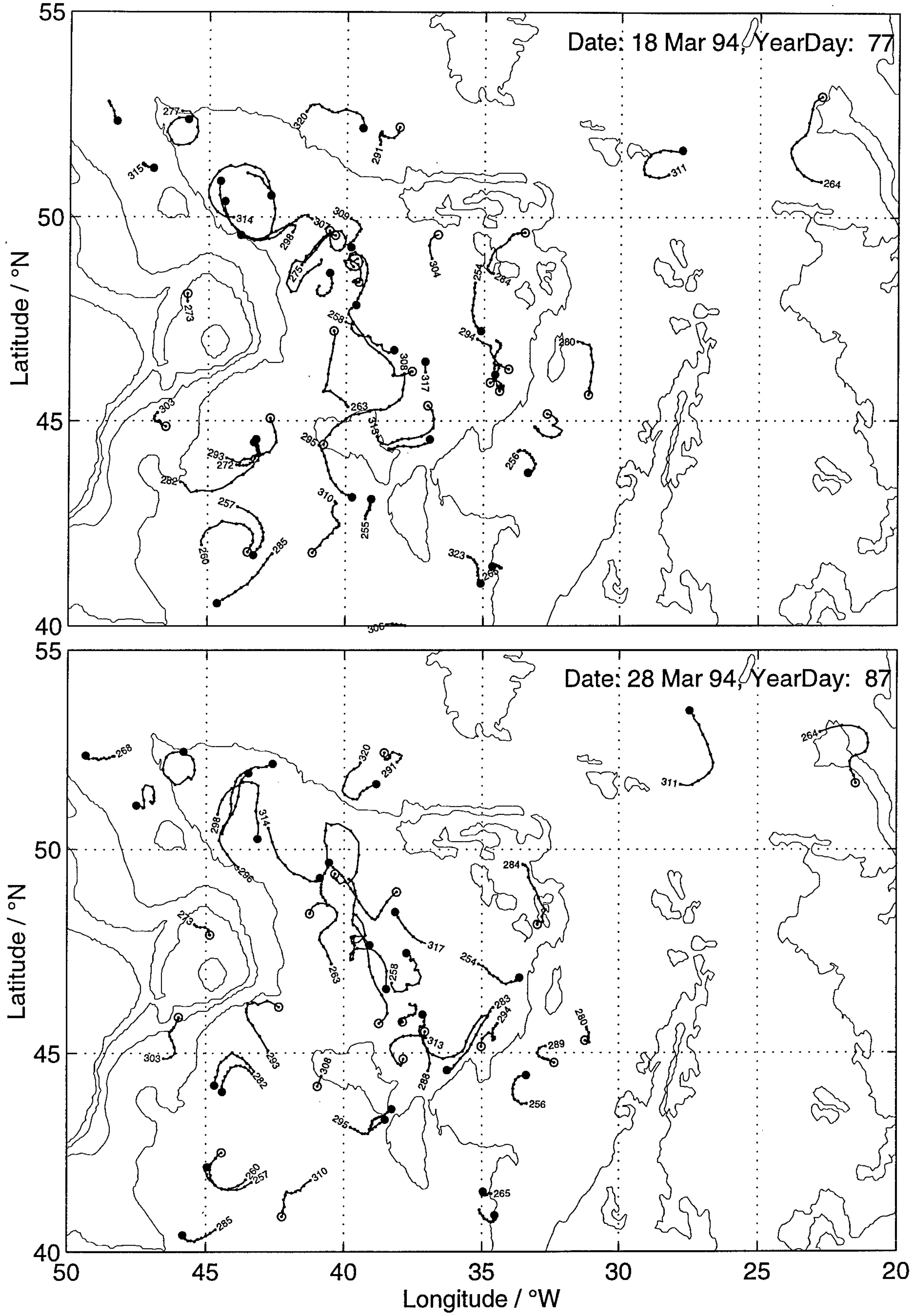


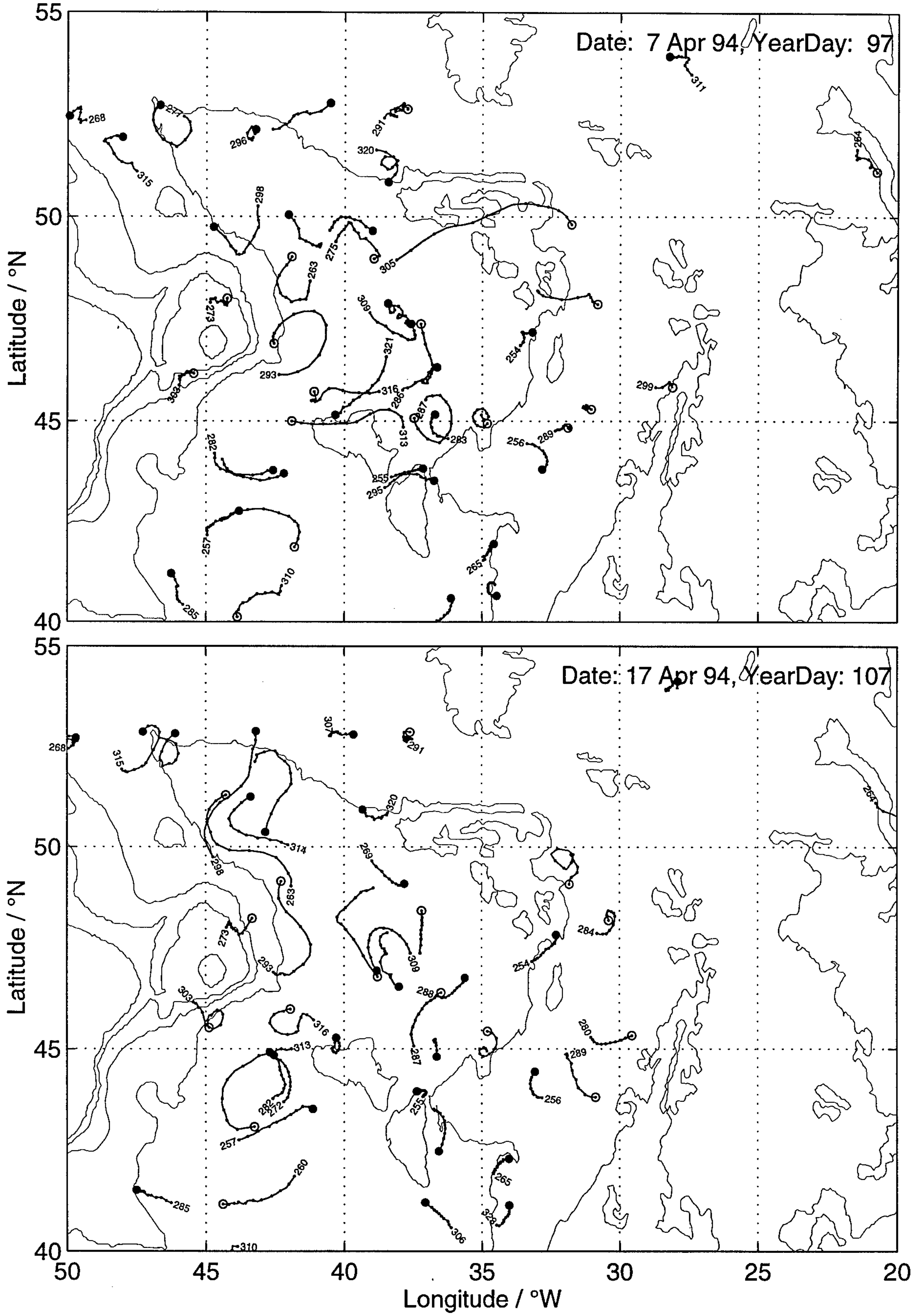
Date: 28 Dec 93, YearDay: 362
Date: 7 Jan 94, YearDay: 7
Latitude / °N
Longitude / °W

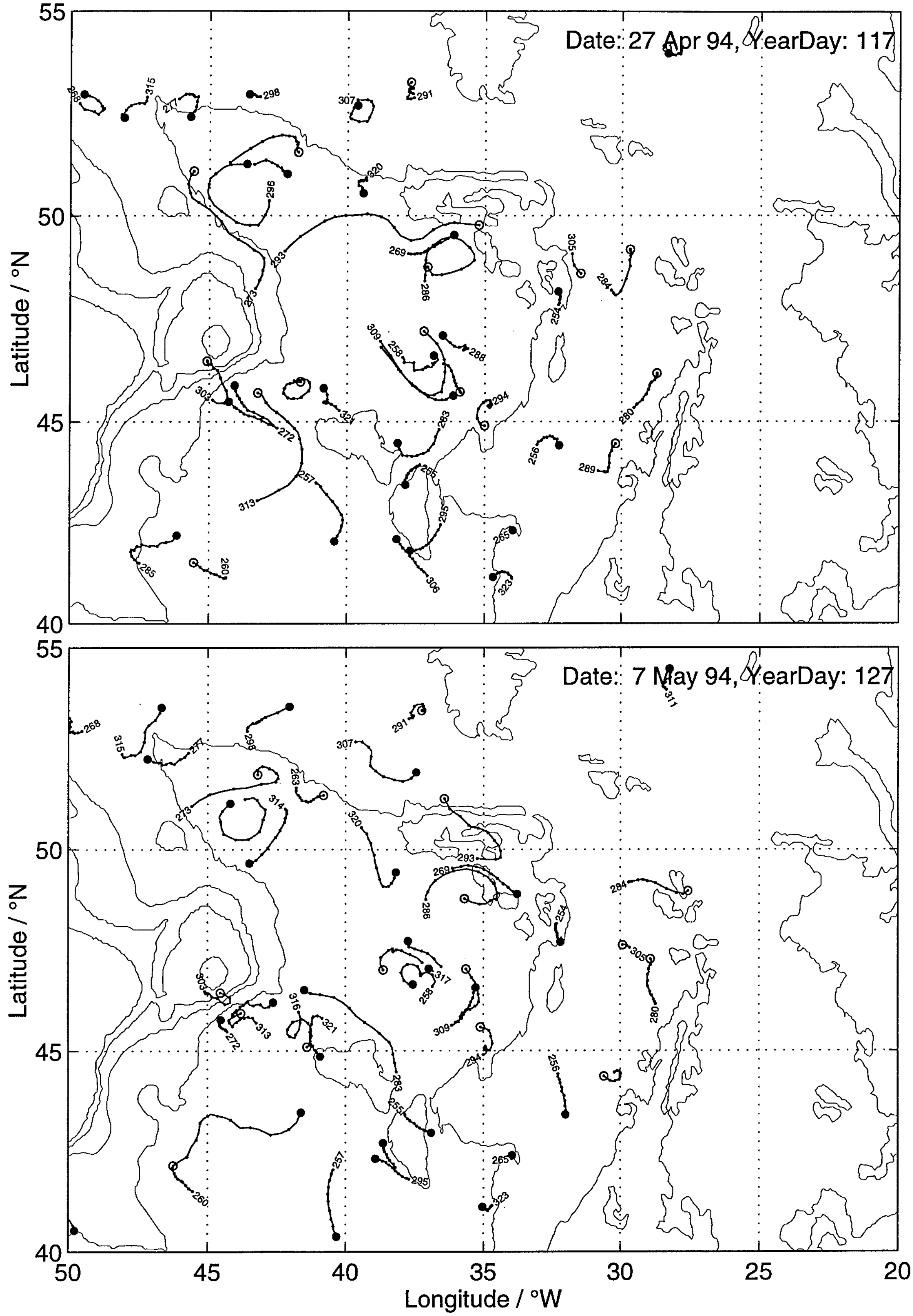

Date: 17 Jan 94, YearDay: 17
Date: 27 Jan 94, YearDay: 27
Latitude / °N
Longitude / °W
55
50
45
40
20
25
30
35


Date: 6 Feb 94, YearDay: 37
Date: 16 Feb 94, YearDay: 47
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

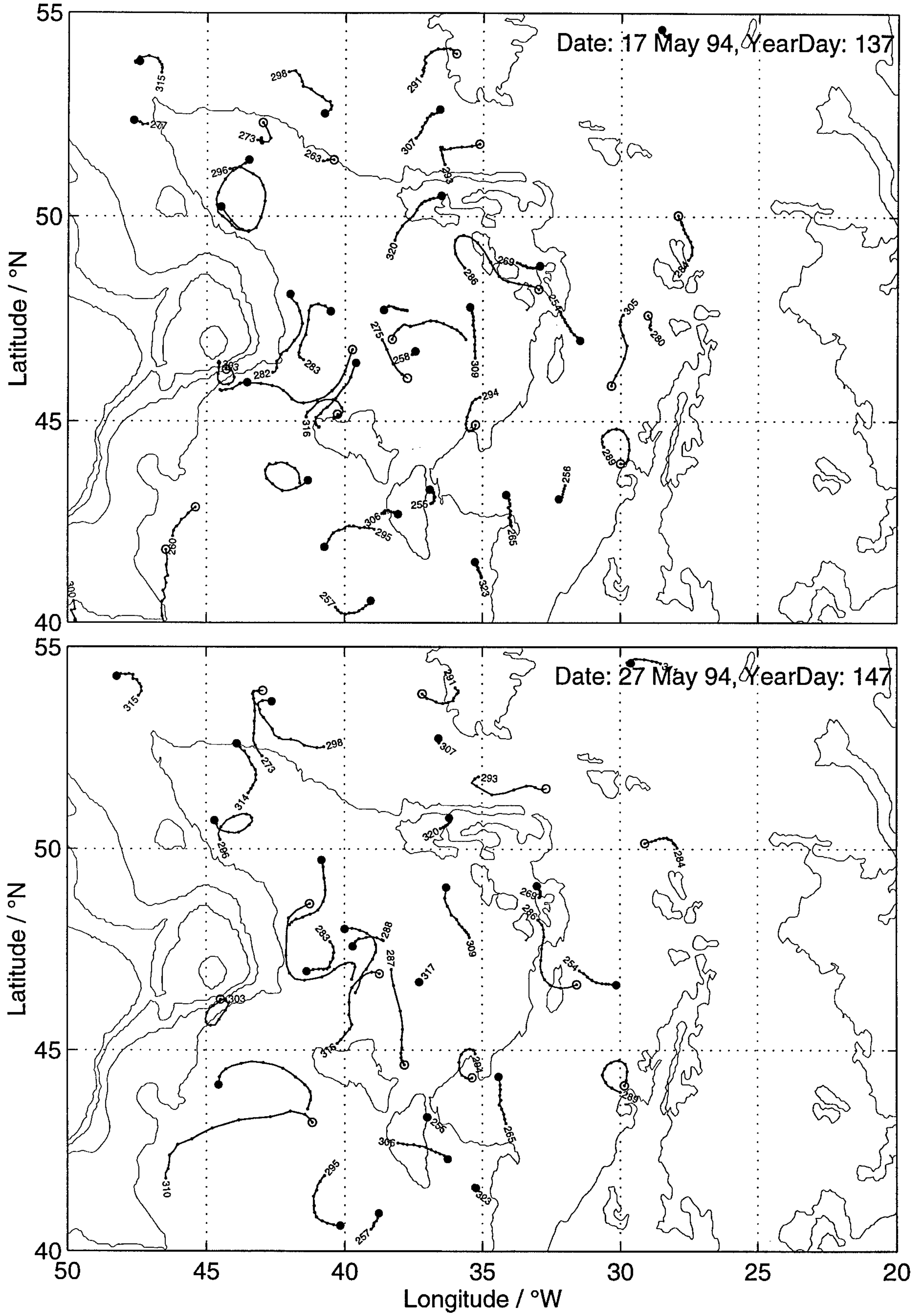

Date: 26 Feb 94, YearDay: 57
Date: 8 Mar 94, YearDay: 67
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

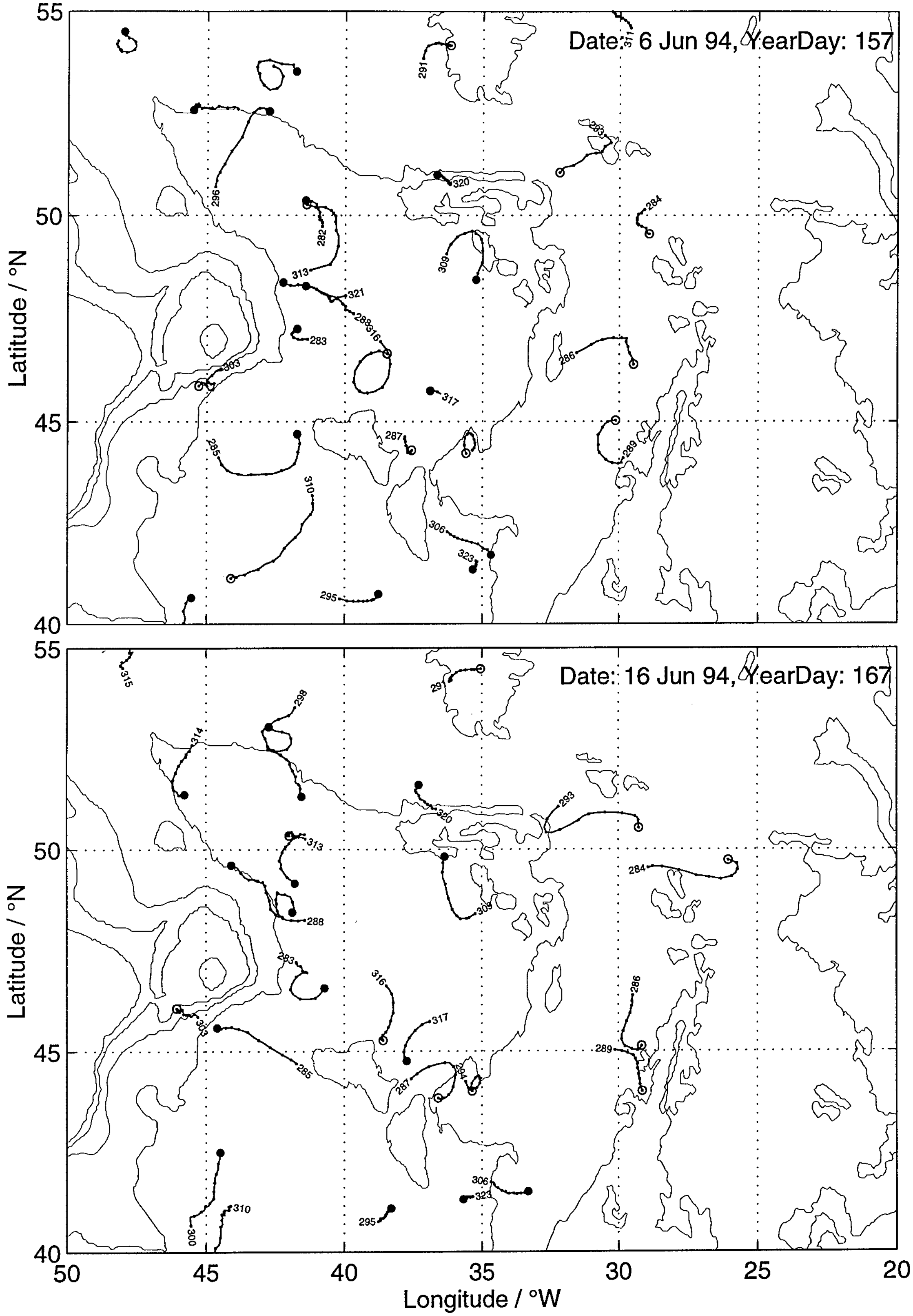

Date: 18 Mar 94, YearDay: 77
Date: 28 Mar 94, YearDay: 87
Latitude / °N
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

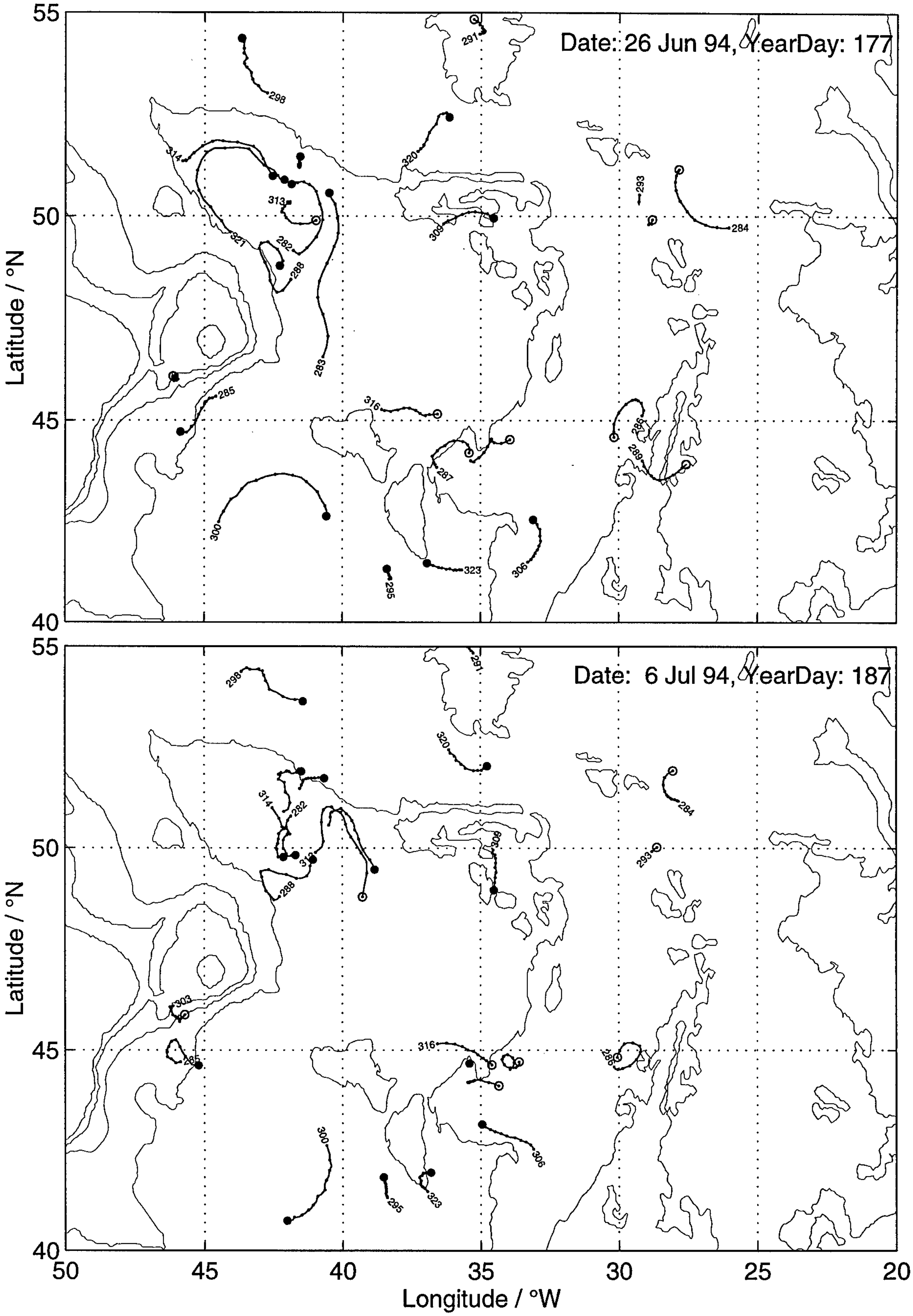

Date: 7 Apr 94, YearDay: 97
Date: 17 Apr 94, YearDay: 107
Latitude / °N
Longitude / °W

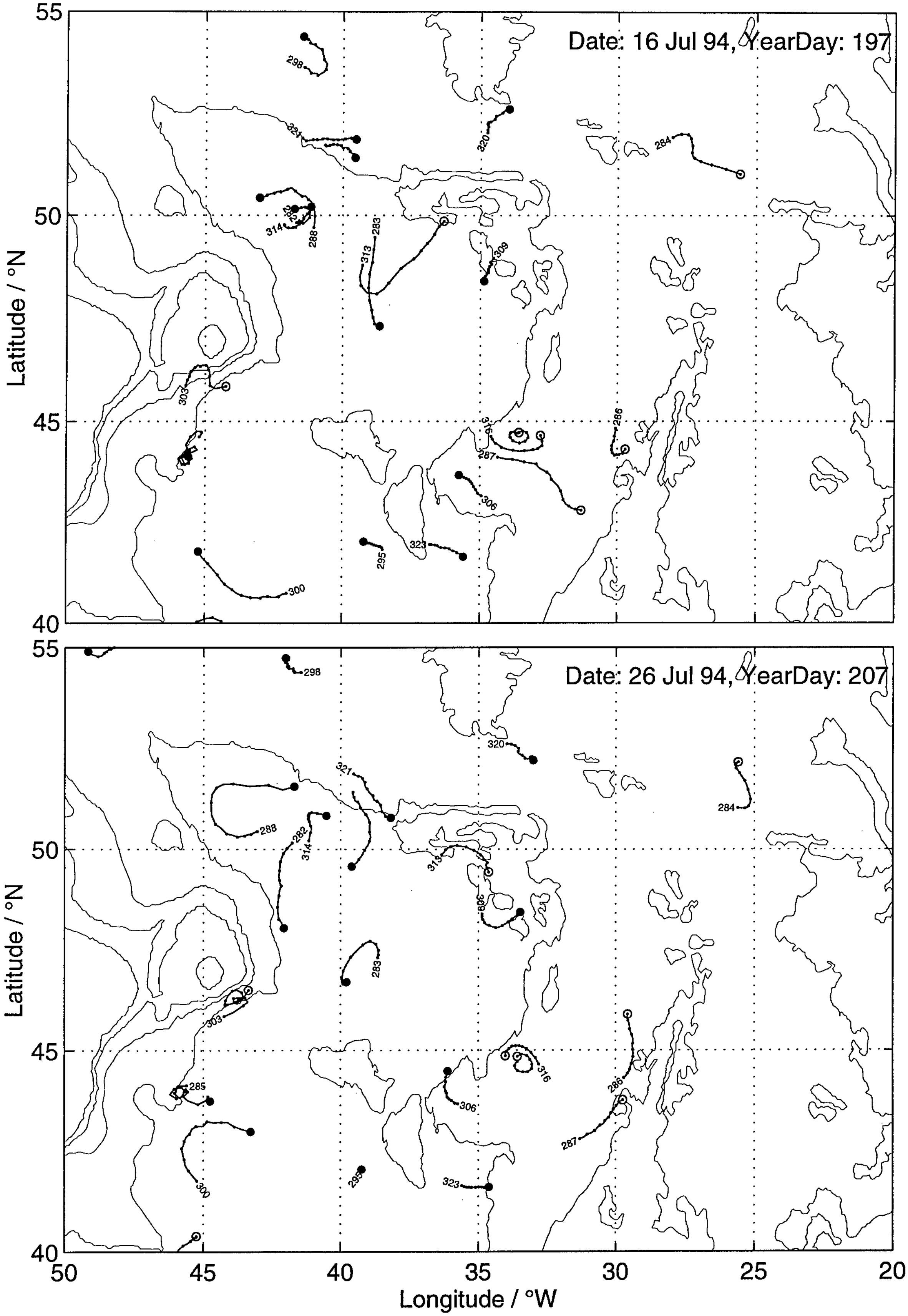


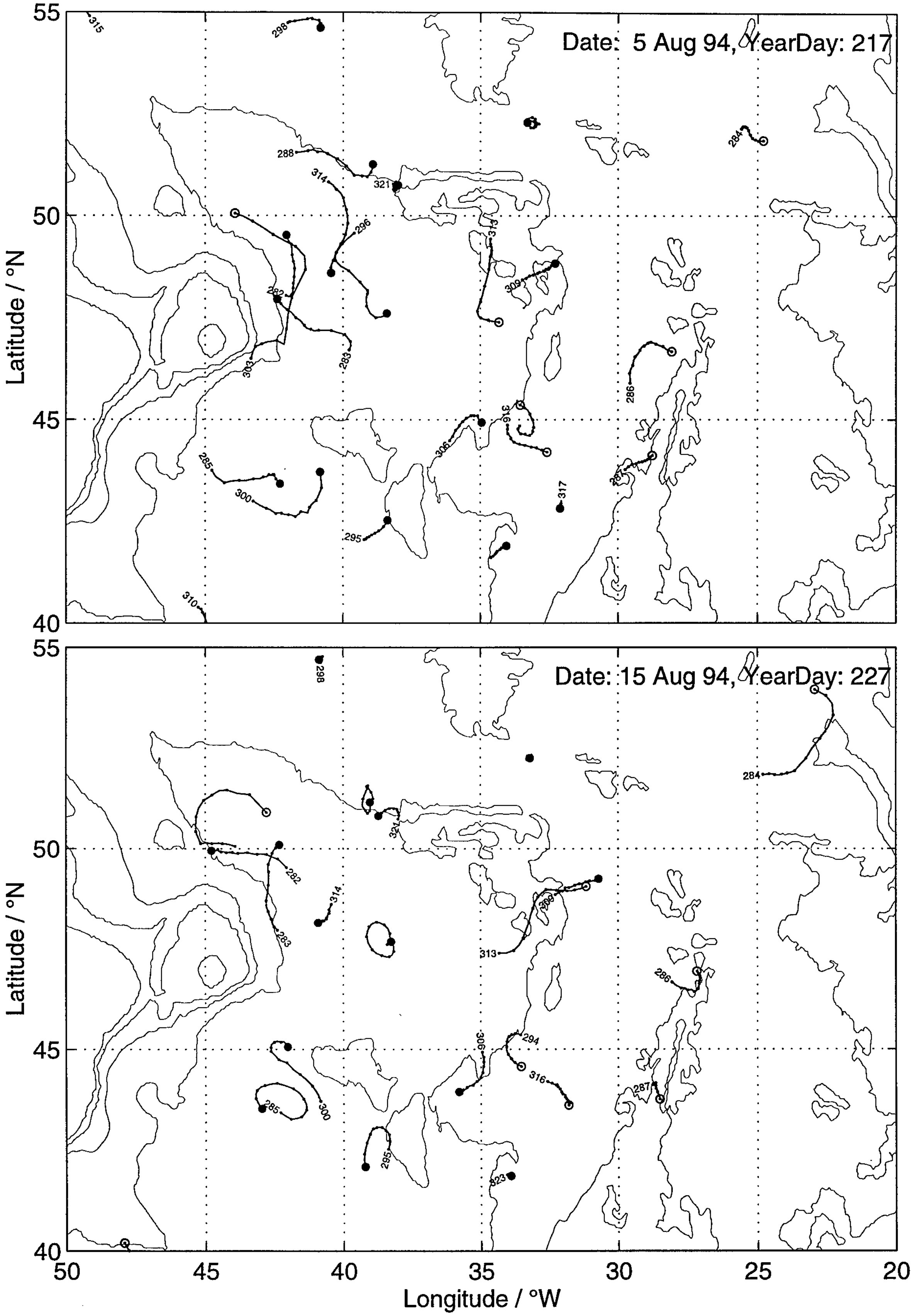
Date: 27 Apr 94, YearDay: 117
Date: 7 May 94, YearDay: 127
Latitude / °N
Longitude / °W


Date: 17 May 94, YearDay: 137
Date: 27 May 94, YearDay: 147
Latitude / °N
Longitude / °W
55
50
45
40
20
25
30
35

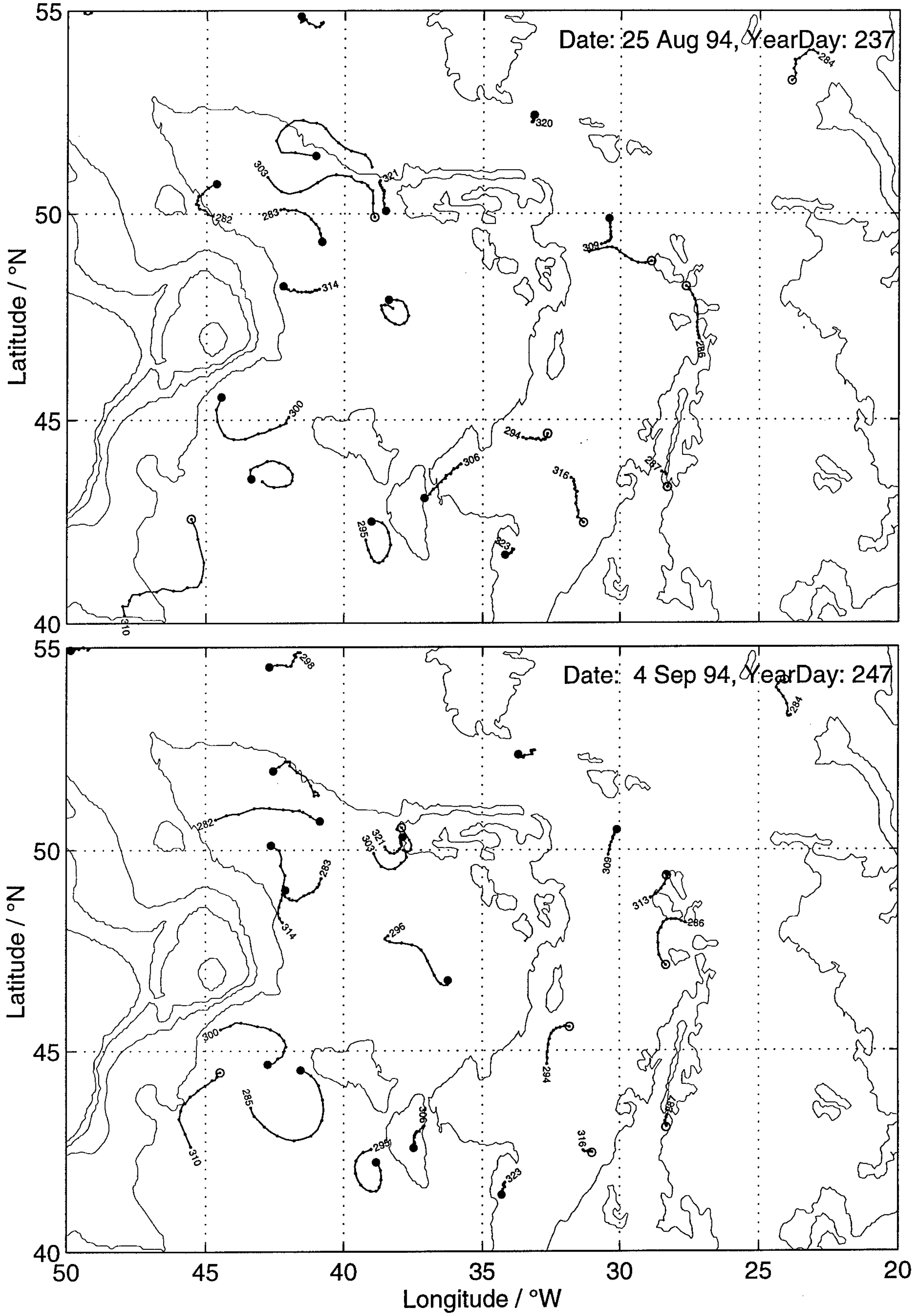

Date: 6 Jun 94, YearDay: 157
Date: 16 Jun 94, YearDay: 167
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

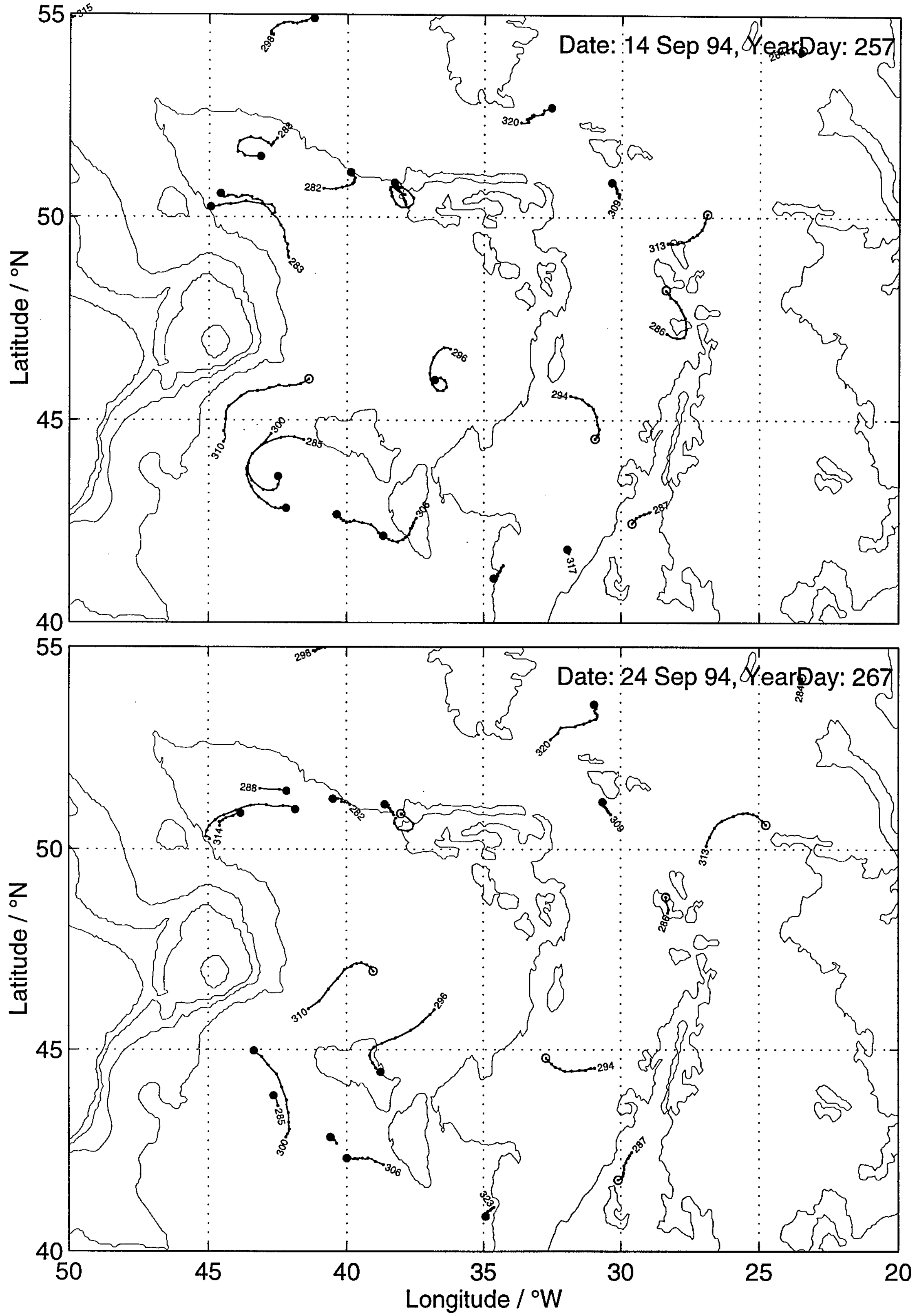

Date: 26 Jun 94, YearDay: 177
Date: 6 Jul 94, YearDay: 187
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

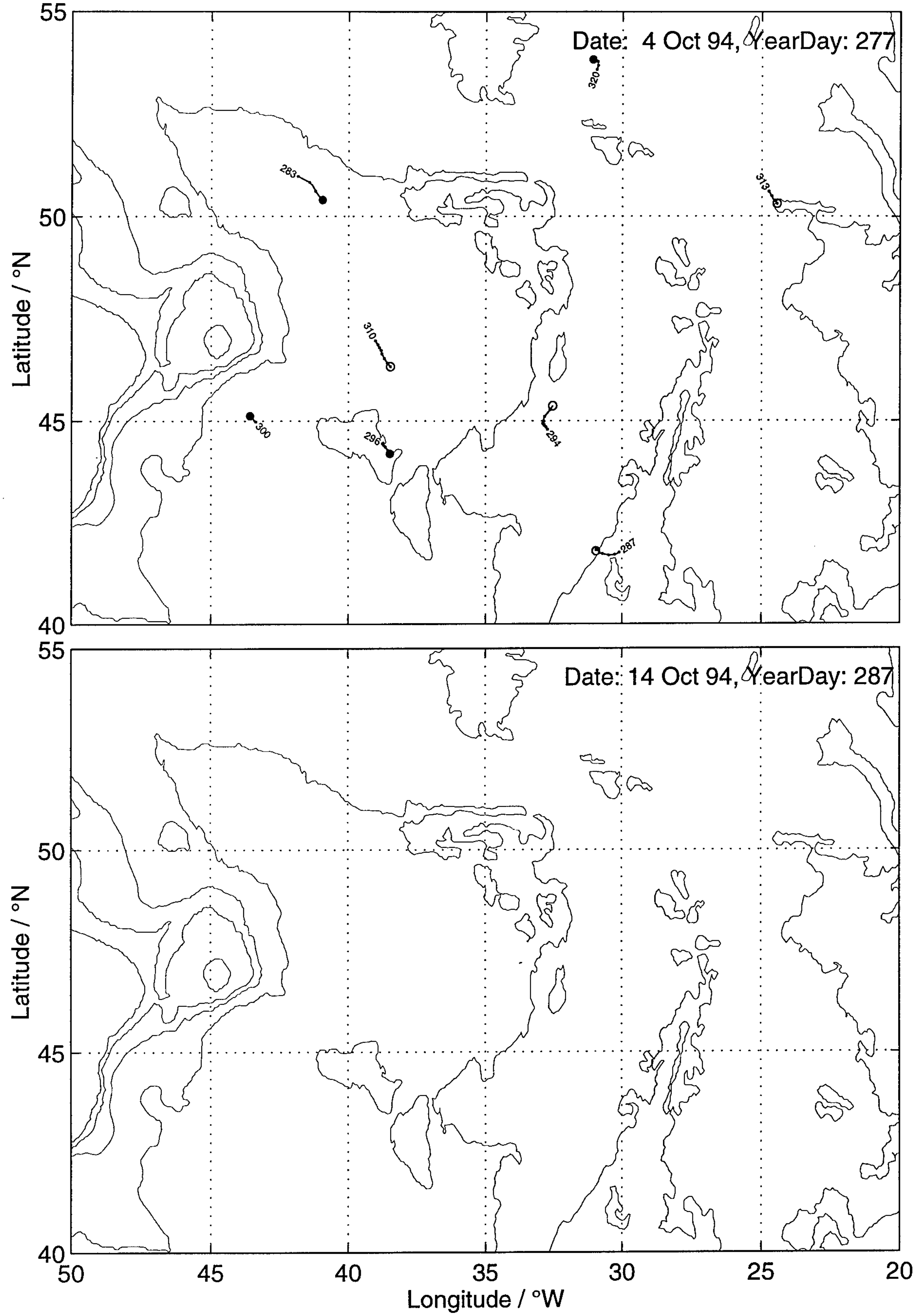

Date: 16 Jul 94, YearDay: 197
Date: 26 Jul 94, YearDay: 207
Latitude / °N
Longitude / °W



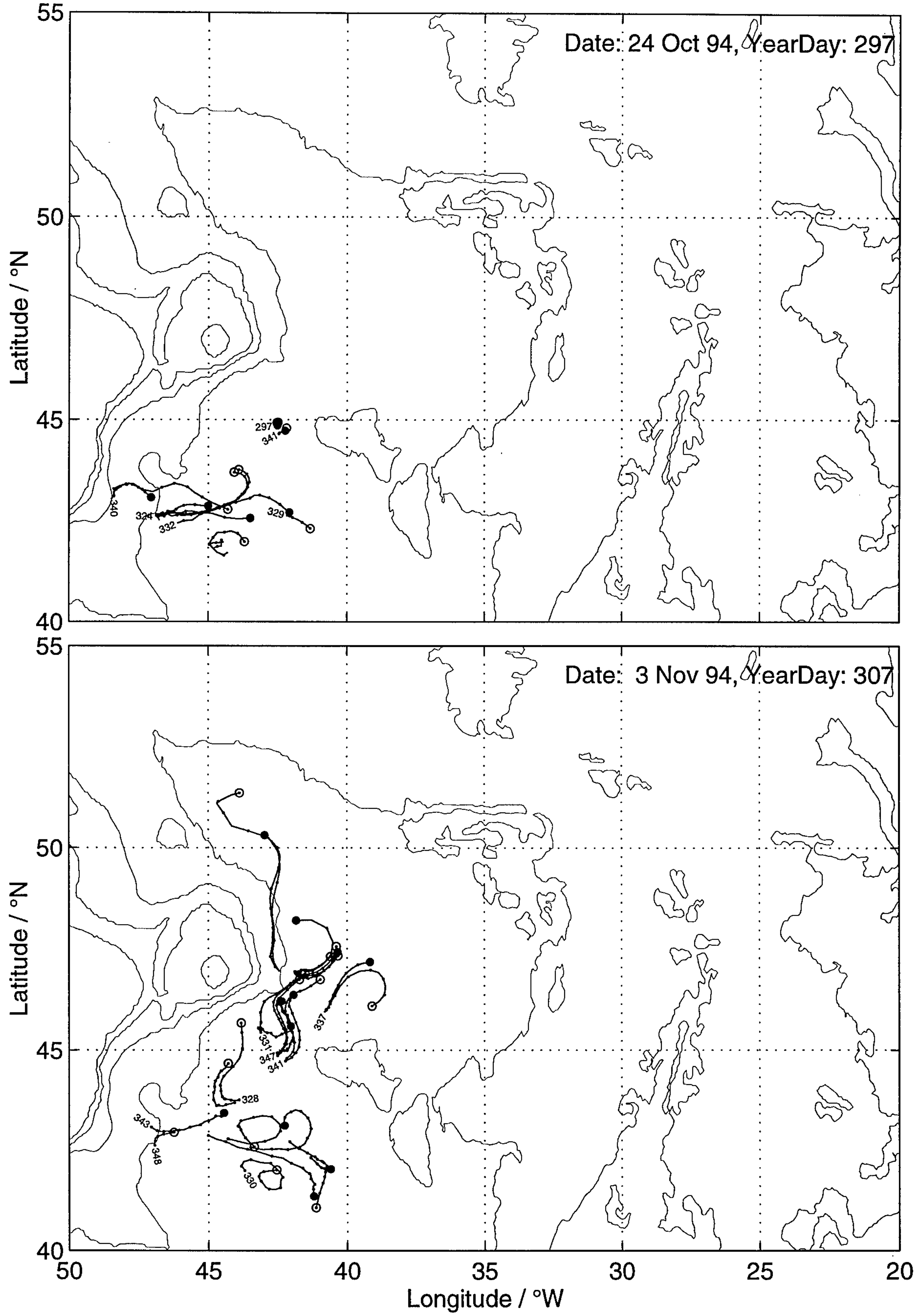
Date: 5 Aug 94, YearDay: 217
Date: 15 Aug 94, YearDay: 227
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

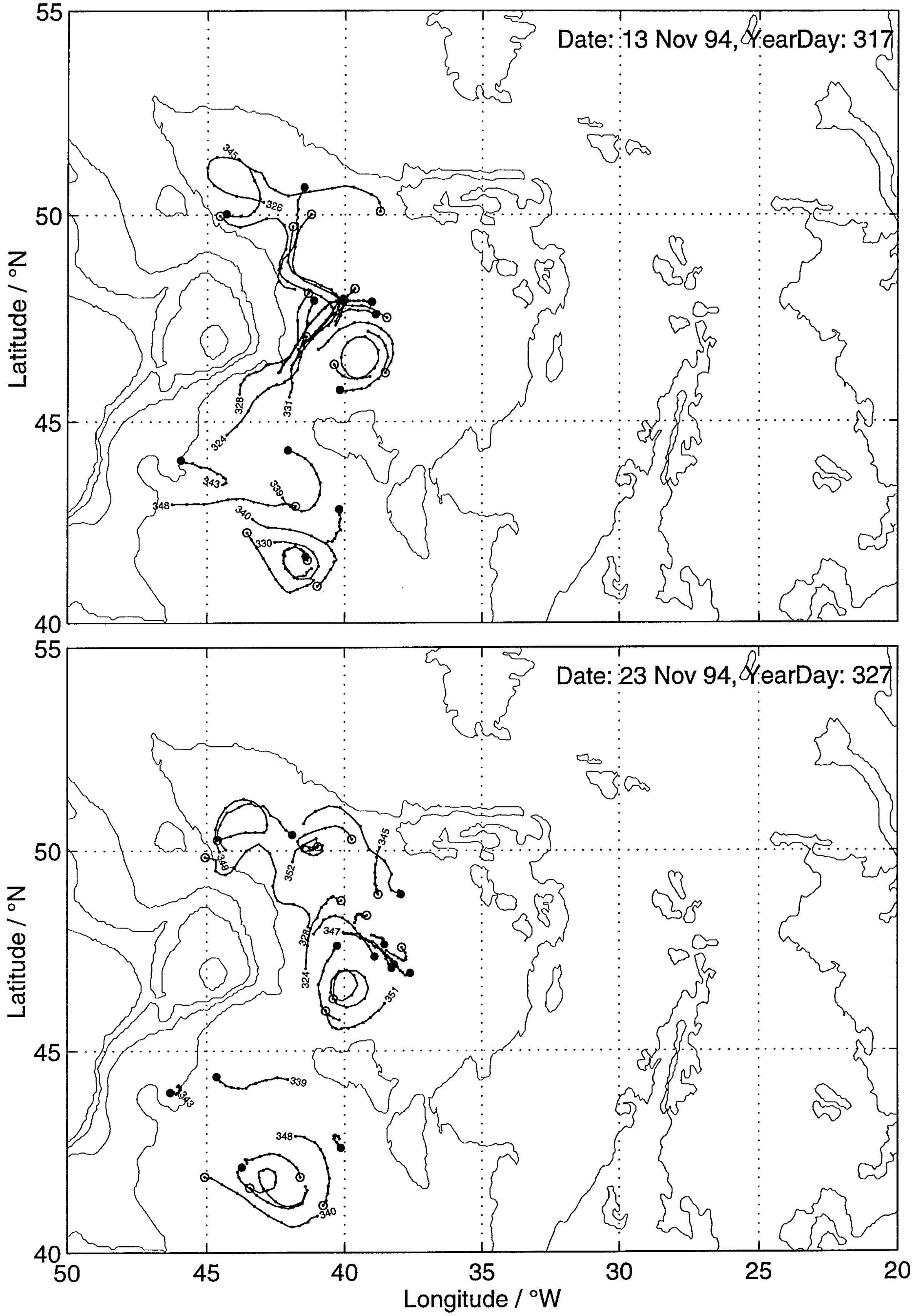

Date: 25 Aug 94, YearDay: 237
Date: 4 Sep 94, YearDay: 247
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20

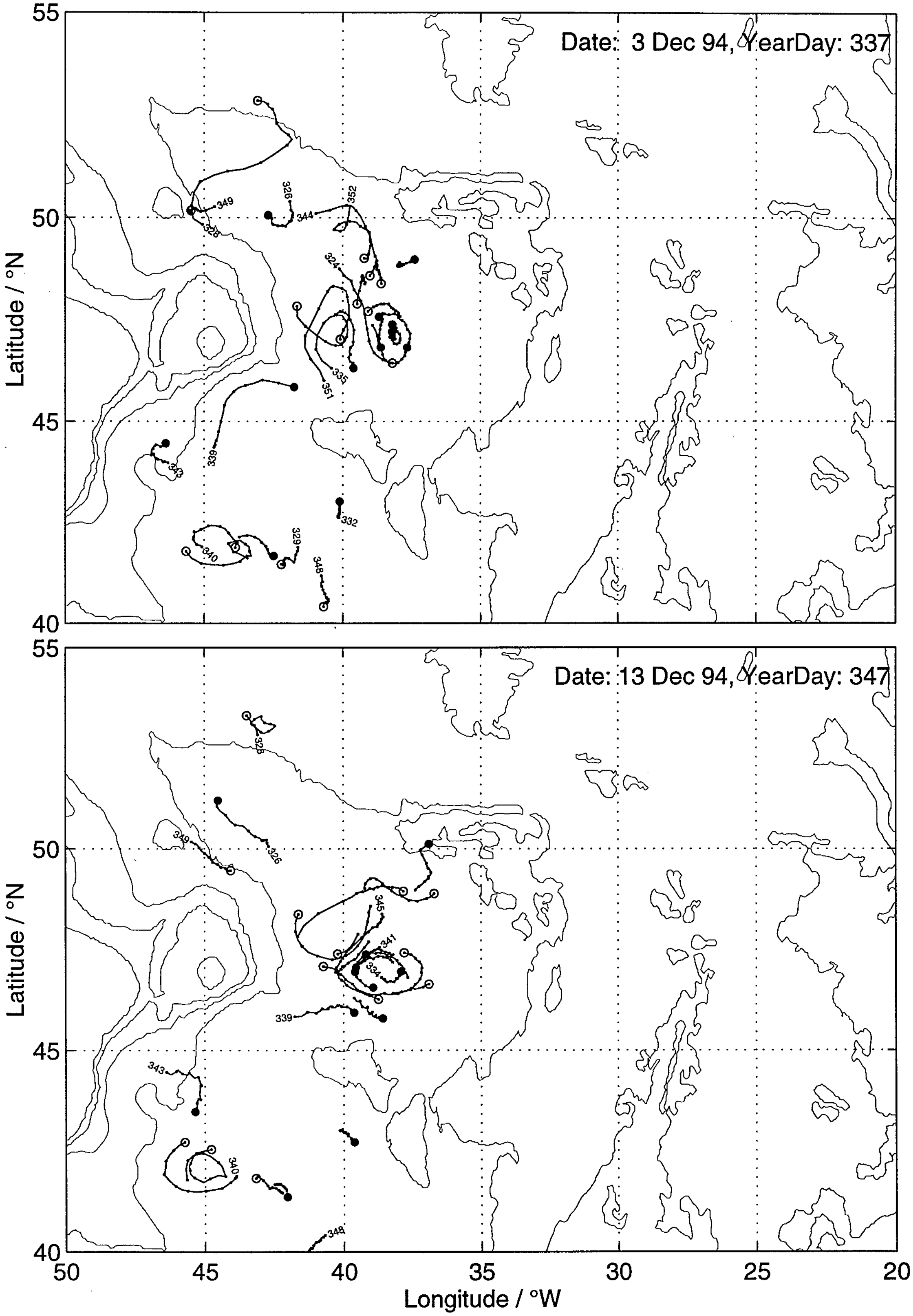

Date: 14 Sep 94, YearDay: 257
Date: 24 Sep 94, YearDay: 267
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20



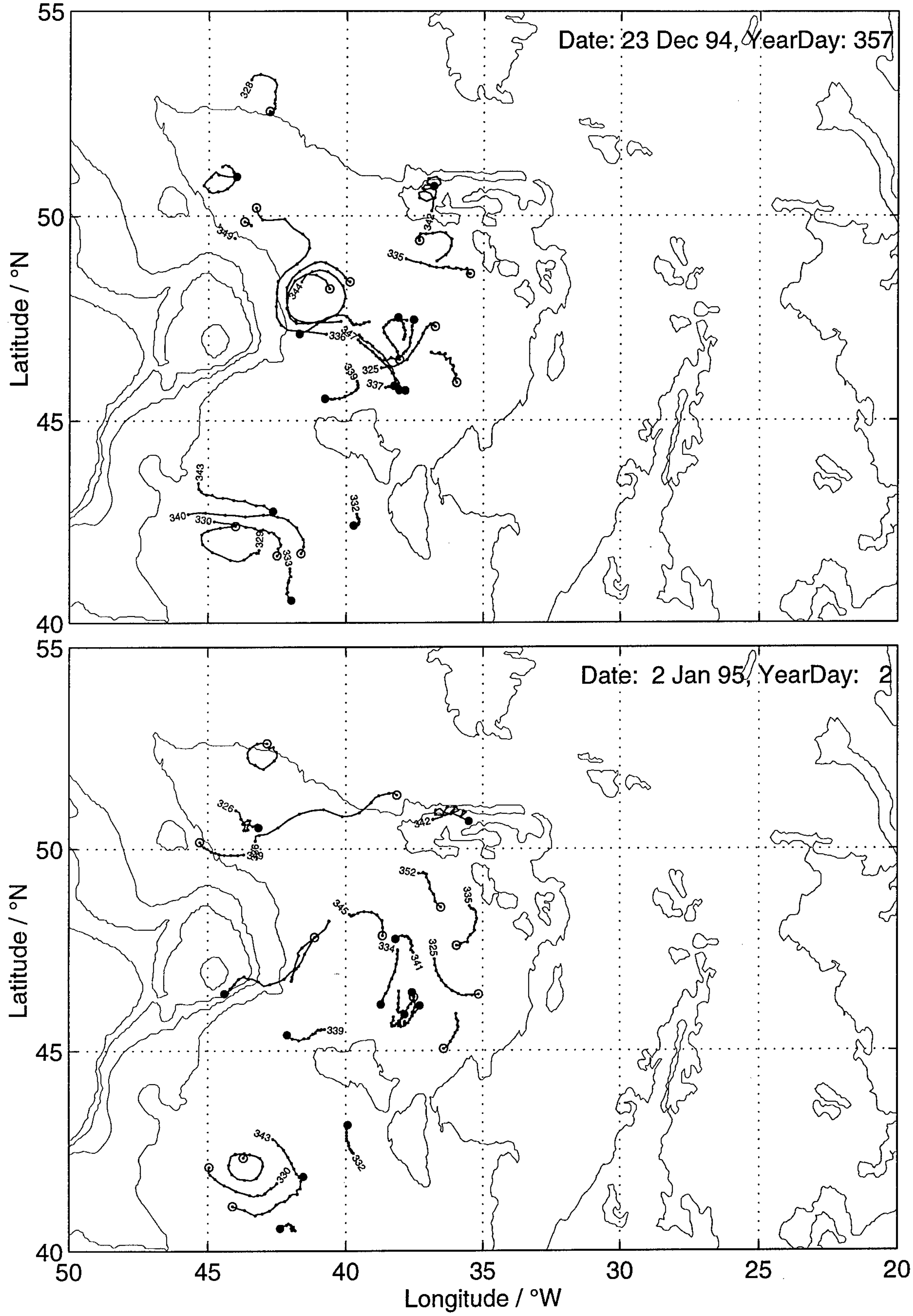
Date: 4 Oct 94, YearDay: 277
Date: 14 Oct 94, YearDay: 287
Latitude / °N
Longitude / °W
283
310
300
296
294
287
320
313

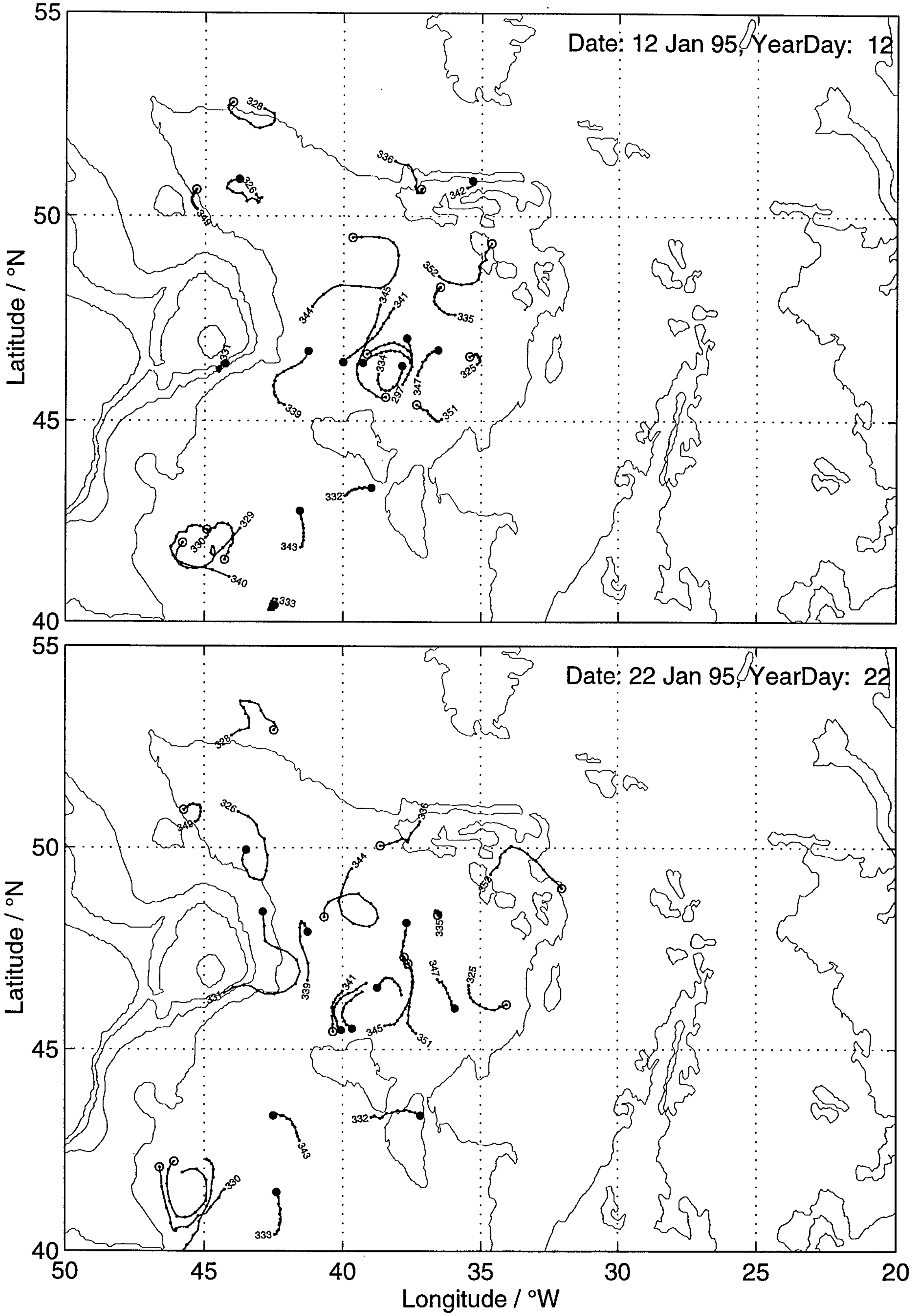

Date: 24 Oct 94, YearDay: 297
Date: 3 Nov 94, YearDay: 307
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20
297
341
340
324
332
329
331
347
341
337
328
343
348
330


Date: 13 Nov 94, YearDay: 317
Date: 23 Nov 94, YearDay: 327
Latitude / °N
Longitude / °W
55
50
45
40
35
30
25
20

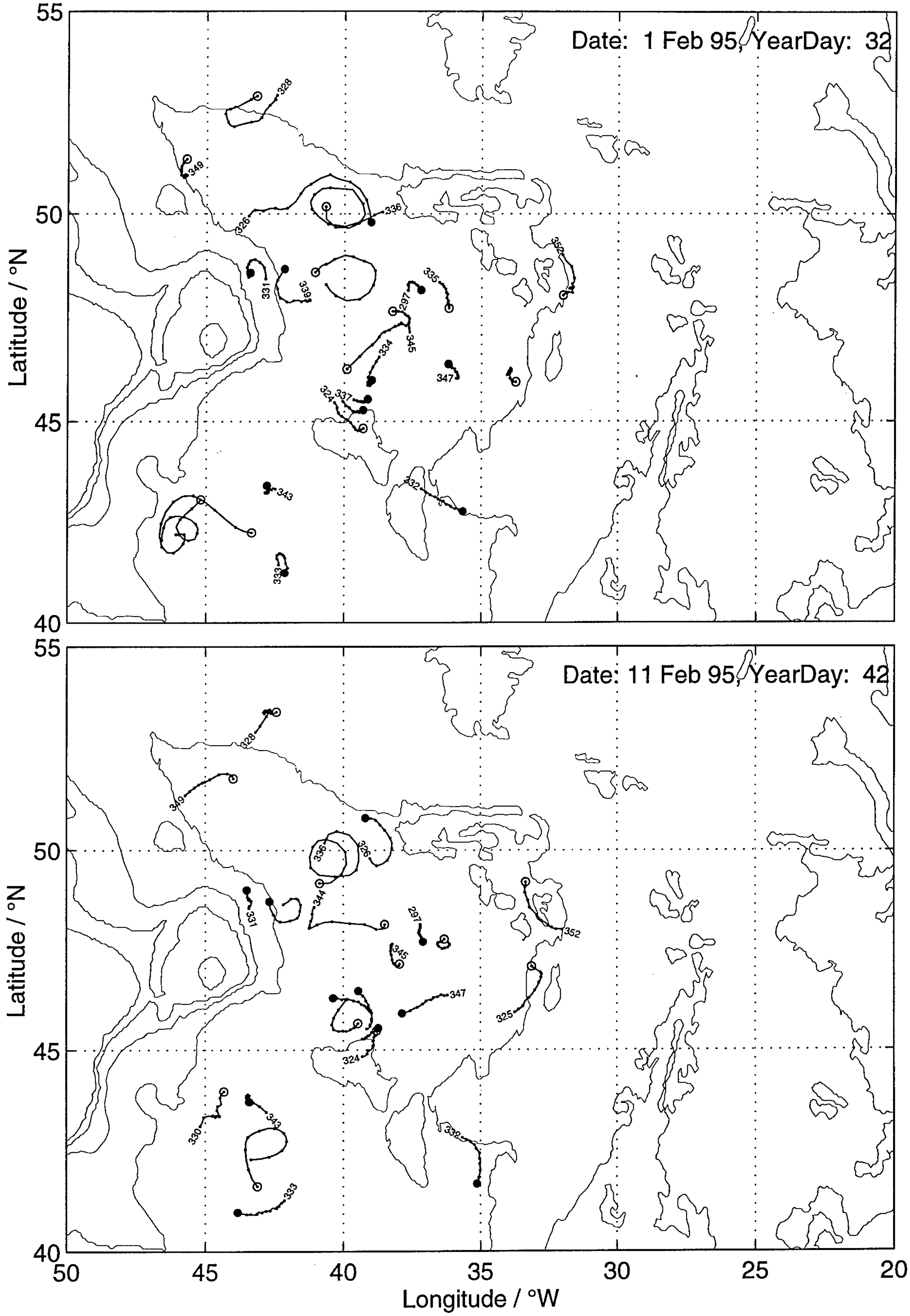


Date: 3 Dec 94, YearDay: 337
Date: 13 Dec 94, YearDay: 347
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20


Date: 23 Dec 94, YearDay: 357
Date: 2 Jan 95, YearDay: 2
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20



Date: 12 Jan 95, YearDay: 12
Date: 22 Jan 95, YearDay: 22
Latitude / °N
Longitude / °W


Date: 1 Feb 95, YearDay: 32
Date: 11 Feb 95, YearDay: 42
Latitude / °N
Longitude / °W
55
50
45
40
50
45
40
35
30
25
20
328
349
326
336
331
339
335
297
345
334
347
324
337
343
332
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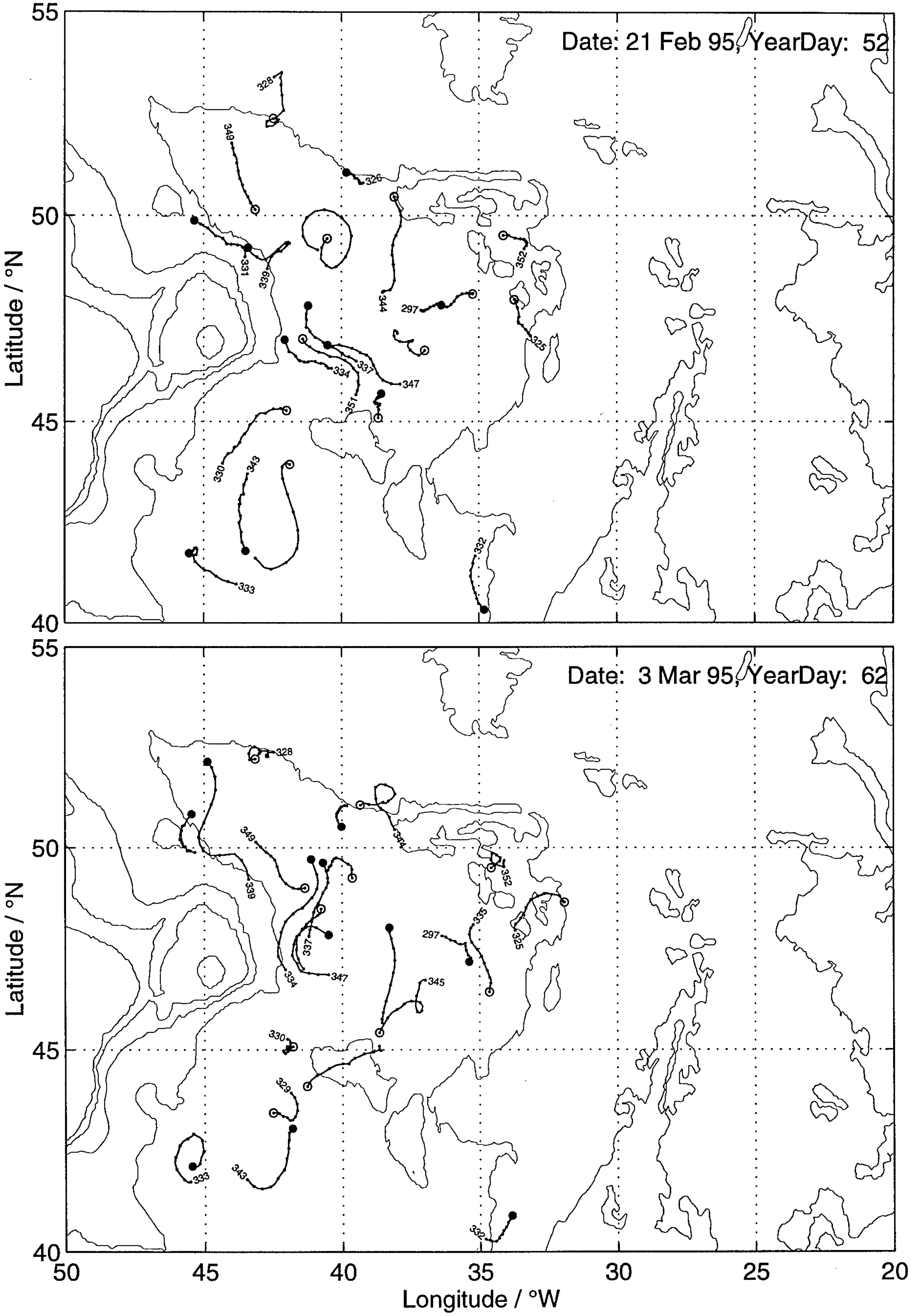
352
344
325
330


Date: 21 Feb 95, YearDay: 52
Date: 3 Mar 95, YearDay: 62
Latitude / °N
Longitude / °W
55
50
45
40
20
25
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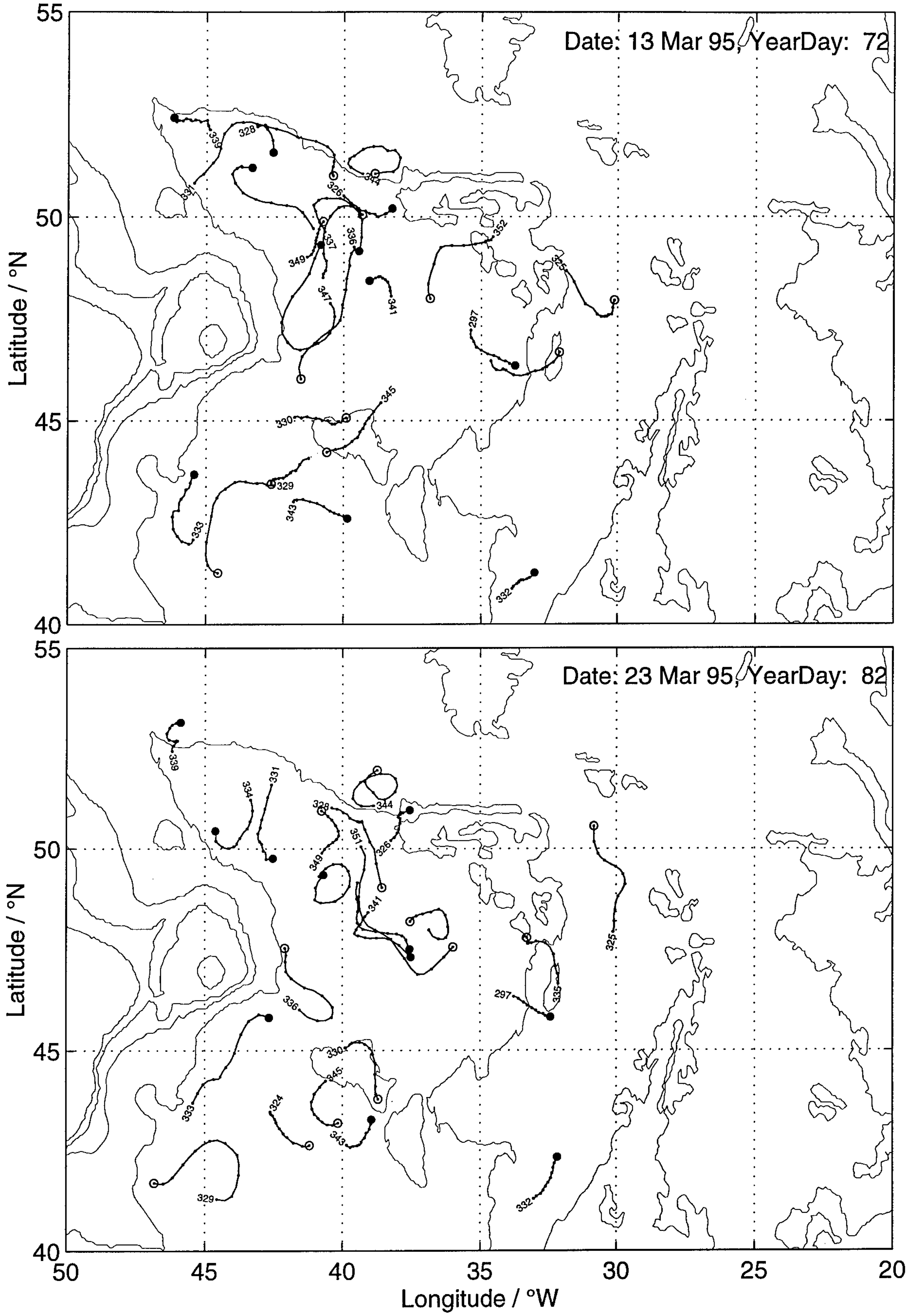
35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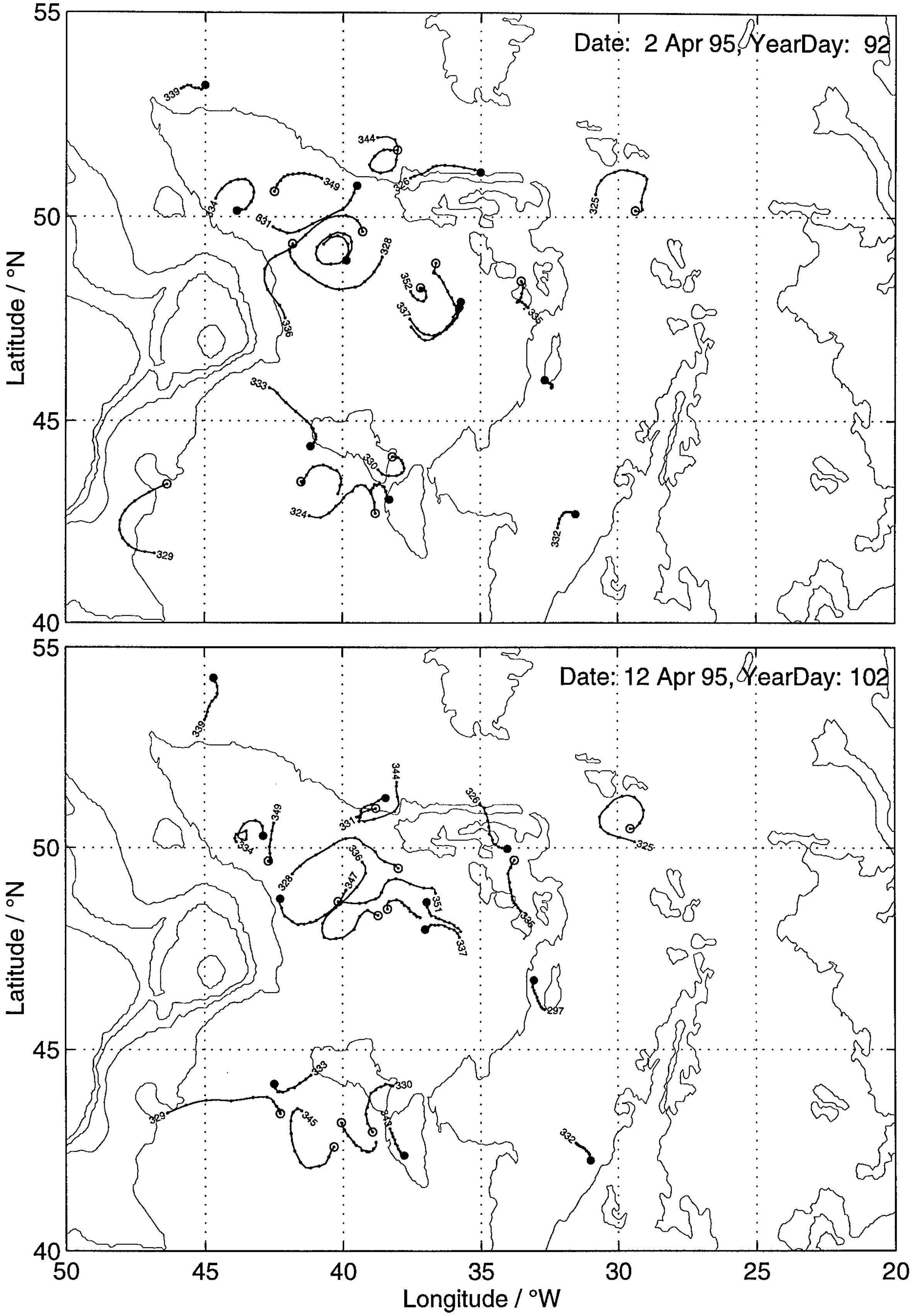
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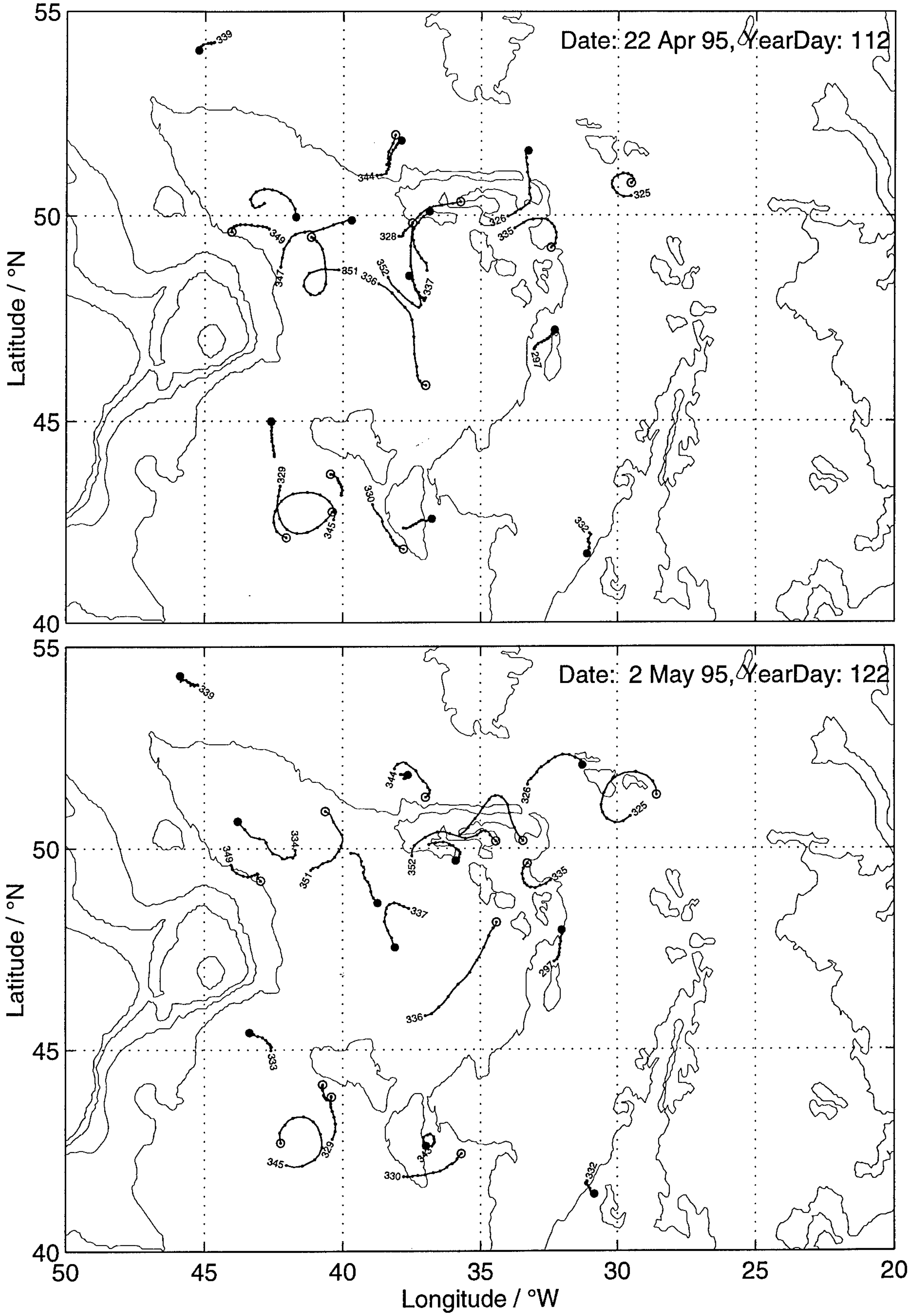

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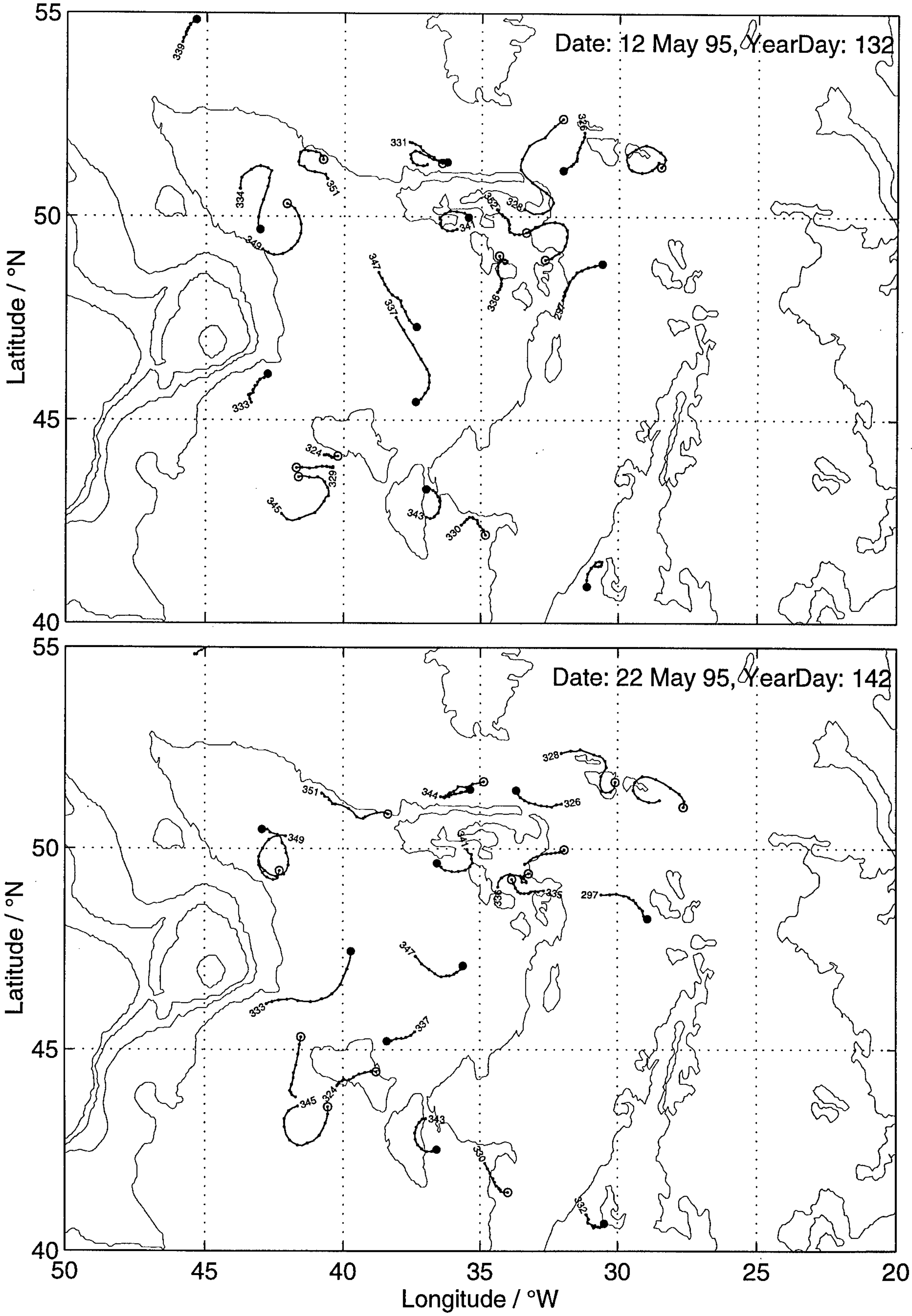
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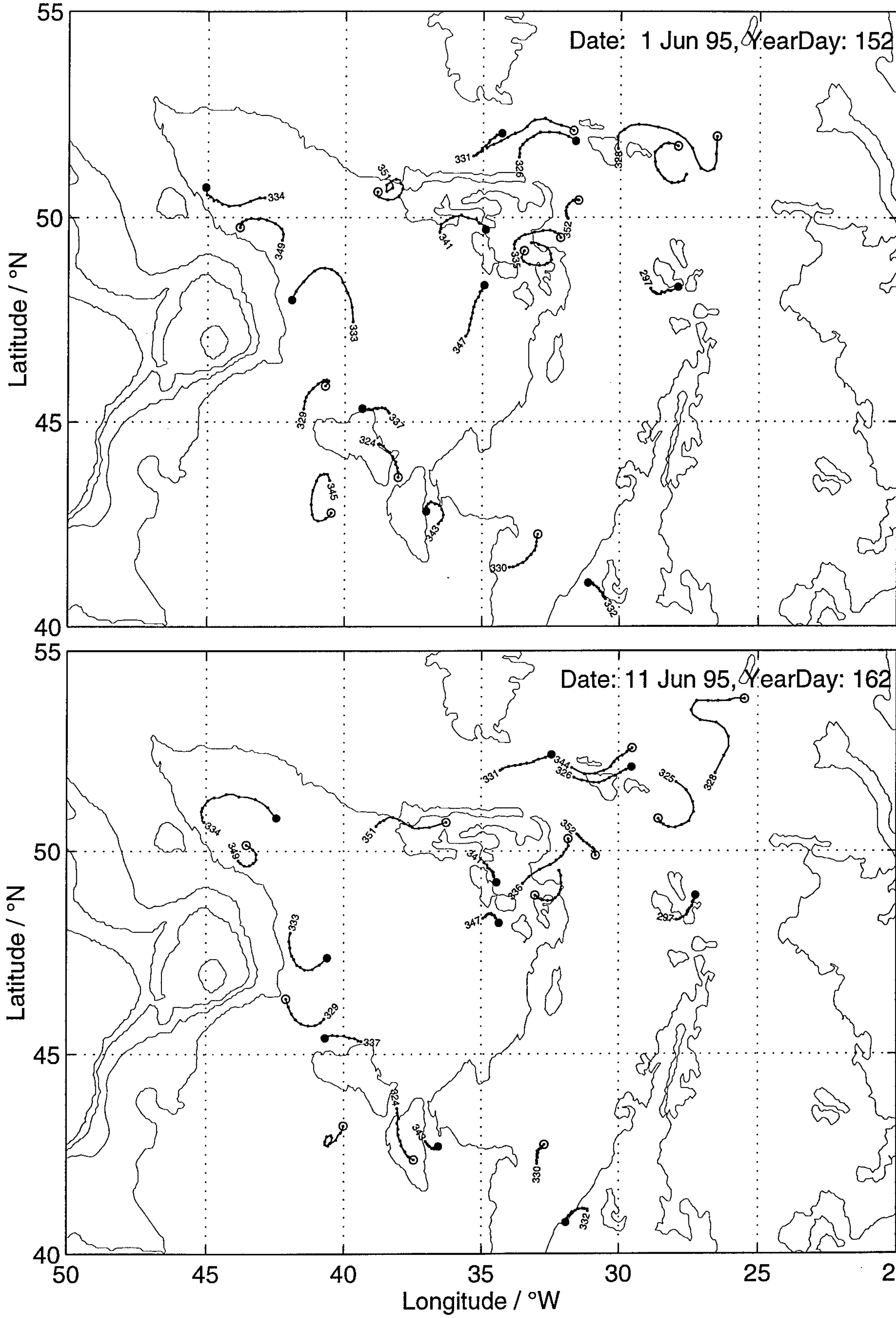
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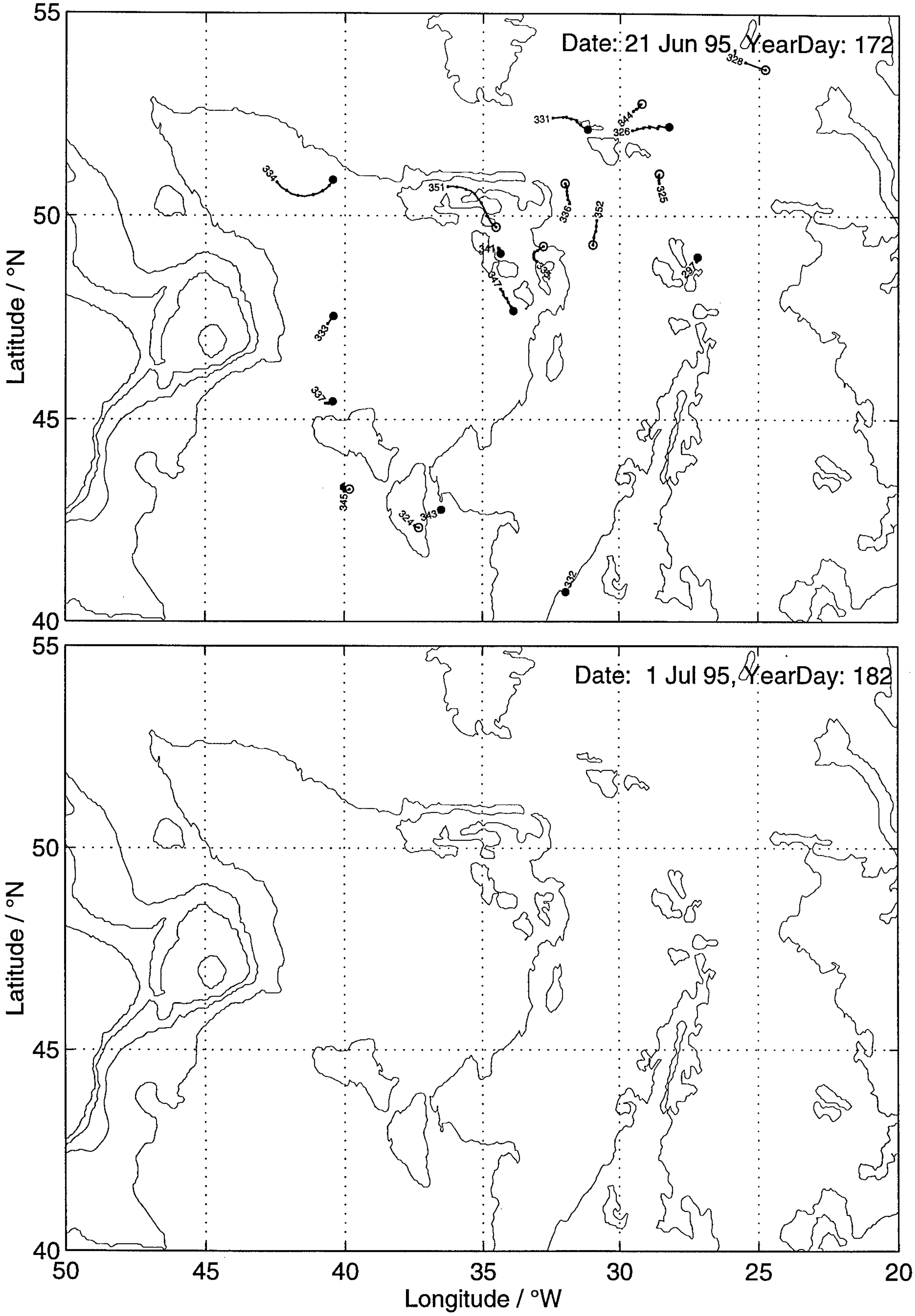

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Sandra Anderson-Fontana, Mark Prater, and H. Thomas Rossby

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19. ABSTRACT (Continue on reverse if necessary and identify by block number)

This report is a summary of all RAFOS float data collected during the 1993-1995 study of the North Atlantic Current (NAC) and adjacent waters in the Newfoundland Basin. The objective of the program was to study the structure of the currents in the NAC region and the exchange of waters between the subtropical and subpolar gyres in the Newfoundland Basin. One hundred floats were deployed during three separate cruises in Summer 1993, Fall 1993, and Fall 1994. The floats were ballasted for a density surface corresponding to sigma-t= 27.2 or 27.5. They were designed to cycle once or twice a day to surfaces 0.1 sigma-t units above and below the targeted density surface in order to determine changes in stratification and temperature along the trajectories. Most float missions had a duration of ten months. The floats were tracked using four moored sound sources deployed in the Newfoundland Basin during the first cruise, and recovered in June 1995. We present the trajectories, velocity time series, and pressure and temperature time series for all floats that could be processed. Of the 100 RAFOS floats deployed, all but eight returned useful data.

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